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Notes of the Month

RESEARCH PROGRESS REPORT

Two aspects of policy which had dominated the work and thinking of the British Cotton Industry Research Association during the past year were, the scheme for re-organisation and re-equipment in the industry and the proposed amalgamation of the Institute with the British Rayon Research Association, said Dr. D. W. Hill (Director of Research) at the recent annual meeting. A further characteristic had been the extent to which the work of the staff had been carried out in mills rather than in the laboratories. Some 60 mill trials of different sorts had been in progress during the year. These were researches rather than investigations for members which, in themselves, amounted to 3,661.

Examination of new machinery and equipment had been continued at the Institute. The granular card was under examination, foreign and British-made draw-frames and combers had been compared, also various double-twist spindle doubling frames, while the best conditions of operation for different high-draft spinning systems under different conditions were being obtained. The OM-S sliver-to-yarn spinning system had been systematically investigated and yarns from it tested and woven into cloth for final assessment of the system; the results of these experiments would appear in the Institute bulletin. The economics of the Unifil winder had also been the subject of an investigation.

In connection with the re-organisation of the trade, a fresh study of re-equipment in spinning had been undertaken; a similar investigation was in hand as a matter of urgency for the weaving section of the trade. The increasing introduction of multi-shift working meant that the old system in which one overlooker was solely responsible for the maintenance of a group of looms was giving way to a system in which looms were adjusted by two or three men in turn. Considerable effort had been devoted to producing standard settings for looms which, said Dr. Hill, could be maintained, thus minimising the effects of individual influences on loom performance. There was no group of absolute best settings, but groups of suitable compromise settings for all loom parts could be defined, and when they had been, all adjustments could be made by gauges; many advantages could be obtained from the use of standard loom settings.

The spinning department had produced a so-called sandwich blender which made mechanically a sandwich stack mixing. Its main applications were expected to be (*a*) for use simply as a spreader to layer material on the floor in the form of a stationary stack; this would produce a layered stack without the need for any manual spreading or treading down; (*b*) to spread material on to a moving lattice, the lattice, feeding into a hopper; this would give a moving stack, and (*c*) to act as a spreader feeding into a container, so that as one stack was being used on the moving lattice, the next stack was being layered in the container; this arrangement would be particularly useful for colour blends and in mills where the cotton in the stack was "aged" for a long time before use. Arrangements had been made with a mill to co-operate in a trial of a machine for the second purpose above, i.e. the moving stack method. Other developments mentioned by Dr. Hill included scutcher-lap control, an automatic-doffing lap former, also a simple, robust spindle brake and automatic clutch as compact as a normal spindle; tests suggested it would operate satisfactorily.

Commenting on the dry feed attachment to the Shirley automatic size box, Dr. Hill said equipment of the latest design—installed at a member's mill—had been in continuous routine use since January and had been highly satisfactory. The work on the self-brushing of warps during sizing had also been vigorously pursued along several lines, and the device concerned was being further developed to ensure that the reduction in dustiness and warp breakage rate anticipated from the experiments at the Institute were fully realised in industrial use.

Believing that any worthwhile improvement in weaving performance beyond the best now attainable was only likely to follow from a detailed knowledge of the fundamentals of the warp breakage phenomenon, the Institute had commenced an investigation along several lines, involving full scale weaving experiments, investigations on a model loom and physical tests on the warp yarns themselves. A detailed statistical analysis of all the data had never been made, but it would undoubtedly be of the greatest value to understanding the causes of warp breaks; it would be a big task since in one experiment alone there were about 30,000 breaks recorded.

The work on chlorite bleaching of yarns and fabrics and on peracetic acid bleaching had continued apace. Considerable work had also been done on printing pastes, particularly with respect to the use of additives to prevent gelation of the pastes. An intensive study was also being made of the principles underlying the flow of fluids in contact with and through textiles. This work had an important bearing on many processes used in finishing, e.g., washing, suction drying, package dyeing, and hot-air drying.

Paper chromatography, mentioned by Dr. Hill, was a recent advance by means of which a separation of extremely small amounts of materials could be achieved. Four or five different materials could be separated from just enough of a mixture to cover a pin's head. Applied to textiles the technique enabled them to separate out the components of commercial dye-mixtures, to identify different nylons either alone or in blends, to identify resin finishes stripped from cloth, or to decide whether a sample of a resin precondensate was safe to use. In connection with static a study was in progress in which special materials, related to

the synthetic fibres, had been prepared and their electrical behaviour was being studied. The nature of the surface and the effects of modifications to it were showing up as most important features of this investigation.

Finally, in commenting on the work of the Technical Economy Department of the Institute, Dr. Hill said "In my view this industry of ours is technically well-equipped and I believe that, while we must go on doing technical research to keep us ahead in the world, the greatest single contribution that the Institute can make to the welfare of the trade in the years immediately ahead is in the investigation of what for a better phrase, we can call management problems. My recent visit to the United States has confirmed me in this view."

£130 m. TEXTILE MERGER PROPOSITION

Two world-famous textile concerns, which together have assets of over £130 m., are to attempt to find a basis for a merger. An announcement to this effect, made jointly by the Boards of Patons and Baldwins Ltd., Darlington, and J. and P. Coats Ltd., Paisley, was issued recently by Morgan Grenfell and Co. Ltd., merchant bankers, who are acting for both firms. The official announcement states that the boards of J. and P. Coats and Patons and Baldwins have been considering the benefits which they believe would accrue to both companies through a closer association between the two businesses. It has now been agreed that detailed discussions should take place with a view to finding a basis for a complete merger between the two companies by means of a holding company. These detailed discussions will necessarily take some time but a further statement will be issued to stockholders as soon as possible.

The chairman of J. and P. Coats, Mr. M. McDougal, is reported as saying it would take some time before the study was complete and the people who would have the final say were, of course, the shareholders. The boards of both companies, he said, would have to be satisfied there was a good case to put before the shareholders. He did not think it possible for a statement to be made until early in the new year.

The business of J. and P. Coats is predominantly the manufacture of cotton and synthetic sewing threads and that of Patons and Baldwins the manufacture of worsted, woollen and synthetic yarns. For many years the two companies have been associated in a number of export markets. This, together with a closer association arising out of the recent joint acquisition of Fleming Reid and Co., owners of the 370 Scotch Wool Shops, have led the two boards to believe that the advantages of a merger of the two companies by means of a new holding company should be fully explored.

J. and P. Coats Ltd. have assets totalling nearly £95·5 m., and in their accounts for the year to last April, Patons and Baldwins showed total assets of £34·8 m.

FUSION OF RESEARCH ACTIVITIES

In his speech at the recent meeting of the British Cotton Industry Research Association, Mr. John Lindley (chairman) said it was particularly significant in that it would probably be the last annual general meeting of Shirley Institute in its present form "Although when we meet together next year our formal business will be to review the activities of the present Association for the year to March 31, 1961, the meeting will not be held for some time after that date, and by then the amalgamation of the Institute and the British Rayon Research Association will almost certainly have been completed, and the new organisation formed from this fusion will be in its first year."

The fusion of the two research associations, he continued, represented the ultimate and rational outcome of the close and friendly co-operation and collaboration that had been built up between them, particularly in recent years. Although all concerned with the two organisations, including interested parties outside, had accepted the concept that the interests of the industry demanded that the most economical use should be made of the scientific man-power, equipment, buildings, and the financial resources of the two bodies, the complete rationalisation of the situation posed many complex problems. Thus, it was all the more gratifying that the Working Party, set up last year to consider the possible fusion of the two Associations, was able, in a short time, to formulate acceptable solutions and in accordance with its recommendations, a joint executive committee was set up to which had been delegated all the necessary powers to bring about the amalgamation.

Four sub-committees had been appointed to deal respectively with matters arising under the headings of research, finance, constitution, and premises. A new memorandum and articles of association and bye-laws had been drafted and, in due course, would be brought before the members for acceptance. The committee had appointed Dr. D. W. Hill as the director of the new organisation and Mr. L. A. Wiseman, the present director of the B.R.R.A., as deputy director of the new Association. Other appointments included Mr. K. E. Lewis as secretary, Mr. H. B. Gee, present Secretary of B.R.R.A., would also join the staff of the new body.

The two directors had agreed on the staff required for the new organisation and it was in connection with staffing that the most difficult problem of fusion had had to be faced. A considerable number of staff at each association had been declared redundant, or asked to accept an earlier retirement than would otherwise have been the case; the total staff concerned was just over one hundred. The situation in relation to redundant staff afforded the industries with which the two associations were connected with an unrivalled opportunity to recruit experienced scientists, technologists, and technicians, and it was earnestly hoped that all firms concerned would take full advantage of the position. Regarding the fusion operation as a whole, there was no doubt that such problems as it posed would be overcome without undue difficulty. The unified efforts that would be available to the industry would, Mr. Lindley believed, make a timely and essential contribution to the reorganisation of the trade now taking place, and ensure that co-operative research made its full contribution to the future welfare of the industry at a time when, more than ever before, its future was inextricably bound up with the successful application of scientific and technological advances.

In presenting his report, Mr. H. A. J. Duncan (honorary treasurer), said the most striking feature of the balance sheet was the strength of the financial position; he had been associated with Shirley for many years and had never known its finances to be in such a sound state as they were now. Referring to the financial aspect of the fusion, he said that the industry's financial support of the new Association would come mainly from a statutory levy, payable alike by the processors and merchant converters of cotton and man-made fibres. Financial support would also be forthcoming from the producers of man-made fibres. A large annual grant would also be made by the D.S.I.R. and it was confidently expected that during the first few years of the new organisation's life at least, the grant would be on more generous terms than were normally extended to a large and well established research association.

Standard Values for Irregularity in Cotton Spinning*

Now published in English, these latest standards have been thoroughly revised to include developments in recent years. The following is an extract from this new publication and the complete booklet, of course, contains all the diagrams, also standard values for the imperfection indicator

ZELLWEGER LTD., USTER, SWITZERLAND

THE testing of slivers, rovings and yarns with regard to their irregularity of the cross-section, by means of electronical measuring apparatus has been carried out on a much wider scale in recent years. By using the electrical Integrators, it has become possible to determine accurately and within a very short time, the average deviations, whereby the numerical assessment of the irregularity has been facilitated considerably.

Shortly after the first Evenness Tester appeared on the market, Messrs. Zellweger published the first values for the assessment of the irregularity of slivers, rovings and yarns. This has proved to be a very valuable auxiliary means for spinning mills. Based on many values gained by experience, these standard values were revised in 1952 and have since been newly published. In the five years since the publication of these values, further information has been gathered on all stages of spinning, and it has been proved that certain processes have been considerably improved, thus making it necessary to revise these values again. The present diagrams and values replace, therefore, all previous issues.

It is already understood that the "Uster" Standard Values are values gained by experience. It is, therefore, not a question of values which have been calculated, but a question of indications which are based on innumerable tests, carried out in various spinning mills all over the world. The average value of all results for a specific process or for a count of yarn has been marked as "average." The limit "uneven" represents the mean of all bad values, and indicates the presence of considerable machine faults or unsuitable machine settings, or is due to unsuitable raw stock. As has been proved by experience, spinning products which lie within this irregularity range, lead to all kinds of difficulties in the following processes. The value "even," on the other hand, represents a limit which is understepped only in very rare cases. It is true that this limit is still attained by numerous spinning mills, and can be kept for quite some time. This, however, calls for optimum settings and well maintained machines, as well as suitable raw stock and efficient quality control.

As is known, the irregularity is influenced in all stages by:—

(1) Characteristics of the processing machines,
(2) Raw stock,
  (*a*) Staple length and its distribution,
  (*b*) Fibre fineness.

In the present tables it would be no use taking into consideration the influences within machines (draw frame, roll settings, processing speed, etc.) as the values themselves serve the purpose of assessing the quality of specific processes. It is up to the designer of the machines or to a pilot plant to investigate these influences.

Only the fibre fineness has been taken into consideration from the various characteristics of the raw stock. It is up to the spinning mill, or the research institutes, to investigate the influence of all the other characteristics of the raw stock on the irregularity and to work them out correspondingly.

The present values, therefore, deliver clues for the magnitude of the irregularity, independent of the machine and other influences. Therefore, only the average values of the three quality degrees "even," "average" and "uneven" exist, and a finer classification has not been made.

In single cases, the indicated values can be replaced by "mill values" based on experience and the standard values.

In the case of standard values for carded cotton of each quality degree, two values have been indicated. Thereby, the lower value refers to better quality and the higher value to worse quality of the raw stock.

The present standard values for the irregularity comprise, besides the tables with the numerical values for average irregularity U % as well as CV % for all processes of carded and combed cotton spinning, also diagrams for the visual assessment of the cross-sectional diagram and further information for the assessment referring to the number of neps and extreme spots in yarns.

Today it is unquestionable that the visual assessment of the diagrams is not only valuable but even indispensable. In the diagram, hints regarding the cause of variations in spun fibres can be found, based on the nature of the variations. In particular, the existence of periodical disturbances, which, in most cases, are caused by machine faults, can be ascertained.

Technical Hints for the Tables for U %, CV % and I

The following technical hints are to be observed when using the standard values:—

U % Average linear irregularity, determined by means of the planimeter or the so-called "linear" Integrator.

CV % Average square irregularity, determined by the statistical calculations or with the so-called "square" Integrator.

* *Published by "Textile Manufacturer," Emmott and Co. Ltd., 31 King Street West, Manchester 3 (price 6s., post free).*

In the ideal case (pure random distribution of the fibres):—

$$CV = 1{\cdot}25 \,.\, U \qquad U = 0{\cdot}8 \,.\, CV$$

Irregularity Index I

As is known, the limit of irregularity of a yarn which would result in the case of a true random distribution would be:—

$$CV_{lim} = \frac{100}{\sqrt{n}}$$

wherein:

CV_{lim} = limit irregularity (smallest theoretical obtainable coefficient of variation of the substance cross-section of the textile material).

n = average number of fibres in the cross-section.

The ratio of the measured irregularity CV_{eff}, resp. U_{eff} to the limit irregularity CV_{lim}, resp. U_{lim}, is found so that a dimensionless factor, the so-called irregularity Index I, is obtained.

$$I = \frac{CV_{eff}}{CV_{lim}} = \frac{U_{eff}}{U_{lim}}$$

whereby the value 1 corresponds to an ideal sliver, roving or yarn. In practice, values obtained for I are always bigger than 1. The worse the textile material, the higher will be the value of I.

When calculating the Irregularity Index I, it is assumed that the fineness of the raw stock can be accurately determined. The calculation of I is very advantageous for spinning mills (see literature).

R % Range of Variation—yard per yard—read from the diagram.

This method of evaluation is particularly popular in the United States of America. The determination is simple and relatively quick. Very often, however, the correction of the value R % is forgotten, which leads to mistakes in the case of diagrams which are not exactly along the centre line. On the average, in the case of practical tests, the following applies:—

$$R\,\% = 4 \,.\, CV\,\% \text{ or } R\,\% = 5 \,.\, U\,\%$$

This evaluation method is very often used if only a diagram is available, or if the sample length to be tested is too short to be evaluated by the Integrator.

However, the big disadvantage of this method is that it allows the evaluation of a length up to 1 yard only, whereas variations longer than 1 yard are, in most cases, neglected.

Evaluation length:

As is known, the value of the average irregularity becomes larger with increasing evaluating length, as more and more long term variations are considered (so-called Variance Length Characteristic). Mostly, however, in the case of an evaluation length of approximately 20 yards, a value which is very close to the total irregularity is obtained. All present values refer to an evaluating length of approx. 20 yards, with a test speed of 8 yds./min. on the "Uster" Evenness Tester. It is recommended, however, to use a higher test speed, whereby the value obtained could be more accurate although it may be somewhat higher.

Test length:

At least 40 yards.

Measuring range:

The measuring ranges indicated refer to the "Uster" Evenness Tester. However, other measuring systems have used our measuring sensitivities of 100/50/25/12·5%, so that even diagrams of other measuring apparatus may be comparable. Particular attention has to be paid to ensure that the average value is correctly set. If not, an optical comparison of the diagrams is not admissible.

Counts:

TEX:	New international direct system in gr./1,000 yds.
Nm:	Metric indirect system in m./gr.
Ne:	English cotton system hanks (840 yds./lb.).

Confidence limit:

DEFINITION

The tests carried out on the Evenness Tester are, basically speaking, only random tests, and are to be considered as such. A random test can give only an approximate value which would result from a test of the total, i.e. from the total production.

This approximation is given by the so-called confidence limit. In most cases, the 95% confidence limits are indicated, which are defined as follows:—

(*continued on page* 430)

PROPOSITION FOR CARRYING OUT THE QUALITY CONTROL IN COTTON SPINNING BY MEANS OF THE EVENNESS TESTER

Machine	*Intervals*	*Number of Samples*	*Readings (with Integrator)*
Scutcher	**Daily (with Varimeter)**	**5 laps per machine**	**Normal (reading every 30 seconds)**
Card	**Monthly after each grinding**	**1 per machine**	**Normal 8 yds./min. 10 readings at intervals of 30 seconds**
Ribbon Lapper	**Every two weeks (with Lap Unwinding Device)**	**1 per machine**	**Normal 8 yds./min. 10 readings at intervals of 30 seconds**
Comber	**Every week (single sliver to be tested with total sliver)**	**2 per machine (total laps), single laps according to requirements**	**Normal 8 yds./min. 10 readings at intervals of 30 seconds**
Draw Frames	**Every week (daily one delivery of each machine)**	**1 per delivery**	**Normal 8 yds./min. 10 readings at intervals of 30 seconds**
Roving Frames	**Weekly check of each roving bank**	**6 bobbins (3 front, 3 rear), from different spindles**	**Normal 8 yds./min. 10 readings at intervals of 30 seconds or 25 - 100 yds./min. 4-1 readings**
Ring Spinning Machine	**According to requirements**	**6 bobbins daily of each quality (random sampling). The test can be carried out simultaneously with the count determination.**	**Normal 8 yds./min. 10 readings at intervals of 30 seconds or 25 - 100 yds./min. 4-1 readings**

Remark: **The spindles or deliveries tested are always to be marked**

STANDARD VALUES U%, CV% AND I FOR COMBED COTTON

Standard Values of the Mean Linear Irregularity U%

Testing material			Fibre Fineness: Metr. No. 7000 Deniers 1·3			Fibre Fineness: Metr. No. 5500 Deniers 1·6		
English	Metric	Tex	even	average	uneven	even	average	uneven
			%	%	%	%	%	%
Card Sliver								
0·14–0·24	0·24–0·40	4200–2500	2·5	4	5	2·8	4·5	5·6
Combed Sliver								
0·14–0·18	0·24–0·30	4200–3300	2·5	5	10	3	6	11·3
Breaker Drawing								
0·12–0·19	0·20–0·32	5000–3100	2·4	3·8	5·7	2·6	4·2	6·3
Finisher Drawing								
0·16–0·34	0·27–0·58	3700–1720	2·2	3·4	4·9	2·5	3·8	5·5
Slubbing								
0·8	1·35	740	2·8	3·8	6	3·1	4·3	6·7
1·2	2·0	500	3·4	4·7	7·4	3·7	5·2	8·2
Single Process Roving								
1·5	2·5	400	2·7	3·9	5·7	3·0	4·4	6·4
1·8	3·0	330	3	4·3	6·2	3·3	4·8	7
2	3·4	295	3·1	4·5	6·6	3·5	5	7·3
3	5·1	197	3·8	5·5	8·1	4·2	6·1	9
4	6·8	147	4·4	6·4	9·3	4·9	7	10·3
5	8·4	119	5	7·2	10·5	5·5	7·9	11·6
Roving								
6	10	98	4·8	6	8·4	5·3	6·6	9·4
7	12	85	5·2	6·5	9·1	5·7	7·2	10
9	15	66	5·9	7·4	10·3	6·5	8·2	11·4
12	20	50	6·8	8·5	12	7·6	9·4	13·2
Yarn								
20	34	29·6	9·4	12·2	15·5	10·3	13·4	17·1
24	40	24·7	9·9	12·7	16·3	11	14	17·6
30	51	19·6	10·8	13·5	17	12	15	18·7
36	61	16·4	11·5	14·5	17·8	12·7	16	19·7
40	68	14·7	11·7	14·8	18	12·9	16·4	19·8
46	78	12·8	12·5	15·1	18·1	13·8	17	20·3
50	85	11·8	12·8	15·4	18·3	14·2	17·1	20·3
60	100	9·8	13·8	16·2	19	15·3	18	21·1
70	118	8·5	14·4	17	20·1	16	18·8	22·2
75	126	7·9	14·7	17·4	21·6	16·2	19·2	22·8
80	135	7·4	14·9	17·7	21	16·5	19·7	23·3
85	144	6·95	15·2	18	20·9			
90	152	6·6	15·2	18·1	20·5			
100	170	5·9	15·3	18·5	21			
120	200	4·9	16·2	18·9	21·6			

Standard Values of the Coefficient of Variation CV%

Testing material			Fibre Fineness: Metr. No. 7000 Deniers 1·3			Fibre Fineness: Metr. No. 5500 Deniers 1·6		
English	Metric	Tex	even	average	uneven	even	average	uneven
			%	%	%	%	%	%
Card Sliver								
0·14–0·24	0·24–0·40	4200–2500	3	5	6·2	3·4	5·6	7
Combed Sliver								
0·14–0·18	0·24–0·30	4200–3300	3·1	6·3	12·5	3·7	7·5	14·1
Breaker Drawing								
0·12–0·19	0·20–0·32	5000–3100	3	4·8	7·2	3·3	5·3	7·9
Finisher Drawing								
0·16–0·34	0·27–0·58	3700–1720	2·8	4·2	6·1	3·1	4·7	6·8
Slubbing								
0·8	1·35	740	3·4	4·8	7·6	3·8	5·3	8·4
1·2	2·0	500	4·2	5·9	9·3	4·7	6·5	10·2
Single Process Roving								
1·5	2·5	400	3·4	4·9	7·1	3·8	5·5	8·0
1·8	3·0	330	3·7	5·4	7·8	4·1	5·9	8·7
2	3·4	295	3·9	5·7	8·3	4·3	6·2	9·2
3	5·1	197	4·8	6·9	10·2	5·3	7·6	11·2
4	6·8	147	5·5	8·0	11·7	6·1	8·8	12·9
5	8·4	119	6·2	9·0	13·0	6·8	9·9	14·5
Roving								
6	10	98	6	7·5	10·5	6·7	8·3	11·7
7	12	85	6·5	8·1	11·4	7·2	9	12·6
9	15	66	7·4	9·2	12·9	8·2	10·2	14·3
12	20	50	8·5	10·7	15	9·4	11·8	16·5
Yarn								
20	34	29·6	11·7	15·2	19·3	13	16·8	21·4
24	40	24·7	12·4	15·8	20·4	13·8	17·5	22
30	51	19·6	13·5	16·9	21·2	15	18·7	23·4
36	61	16·4	14·3	18	22·2	15·8	20	24·6
40	68	14·7	14·6	18·5	22·4	16·2	20·5	24·8
46	78	12·8	15·7	19·3	23	17·3	21·3	25·4
50	85	11·8	16	19·3	23·3	17·8	21·3	25·4
60	100	9·8	17·3	20·3	23·8	19·1	22·5	26·4
70	118	8·5	18	21·3	25·1	20	23·5	27·8
75	126	7·9	18·3	21·7	25·8	20·3	24	28·5
80	135	7·4	18·6	22·1	26·2	20·7	24·5	29·1
85	144	6·95	18·9	22·4	26·3			
90	152	6·6	19	22·6	26·4			
100	170	5·9	19·1	23·0	26·4			
120	200	4·9	20·2	23·6	27·0			

Standard Values of the Irregularity Index I

Testing Material					
English	Metric	Tex	even	average	uneven
			%	%	%
Card Sliver					
0·14–0·24	0·24–0·40	4200–2500	5	8	10
Combed Sliver					
0·14–0·18	0·24–0·30	4200–3300	5	10	20
Breaker Drawing					
0·12–0·19	0·20–0·32	5000–3100	5	8	12
Finisher Drawing					
0·16–0·34	0·27–0·58	3700–1720	3·6	5·5	8
Slubbing					
0·8–1·2	1·35–2·0	740–500	2·5	3·5	5·5
Single Process Roving					
1·5–5·0	2·5–8·4	400–119	1·8	2·6	3·8
Roving					
6–12	10–20	98–50	1·6	2·0	2·8
Yarn					
20	34	29·6	1·7	2·2	2·8
30	51	19·6	1·6	2·0	2·5
40	68	14·7	1·5	1·9	2·3
50	85	11·8	1·5	1·8	2·1
60	100	9·8	1·45	1·7	2·0
80	135	7·4	1·35	1·6	1·9
100	170	5·9	1·25	1·5	1·7
120	200	4·9	1·2	1·4	1·6

STANDARD VALUES U%, CV% AND I FOR CARDED COTTON

Standard Values of the Mean Linear Irregularity U%

Testing Material					
English	Metric	Tex	even	average	uneven
			%	%	%
Card Sliver					
0·14–0·18	0·24–0·3	4200–3300	2·5–2·8	4–4·5	5–5·6
Breaker Drawing					
0·11–0·18	0·19–0·3	5300–3300	2·6–3·4	4–5	6·1–7·8
Finisher Drawing					
0·18–0·28	0·3–0·47	3300–2100	2·8–3·5	4·5–5·6	6·7–8·2
Slubbing					
0·6–1·2	1·0–2·0	1000–500	4·1–5·8	5·6–8	7·6–10·8
Single Process Roving					
1·2–2·4	2–4	500–250	4·4–6·1	5·8–8·2	8–11·2
Yarn					
6	10	100	9	12	15·5
8	13·5	74	10·2	13·1	17
12	20	50	11·4	15·2	19·7
16	27	37	12·2	15·3	20
20	34	29·4	13	16·5	20
24	41	24·4	13·5	17·3	20·6
30	50	20	14·4	18·1	21·8
36	61	16·4	15	18·7	22·3
40	68	14·7	15	18·8	22·5

Standard Values of the Coefficient of Variation CV%

Testing Material					
English	Metric	Tex	even	average	uneven
			%	%	%
Card Sliver					
0·14–0·18	0·24–0·3	4200–3300	3·1–3·5	5–5·6	6·2–7
Breaker Drawing					
0·11–0·18	0·19–0·3	5300–3300	3·3–4·2	5–6·3	7·6–9·8
Finisher Drawing					
0·18–0·28	0·3–0·47	3300–2100	3·5–4·4	5·6–7	8·4–10·4
Slubbing					
0·6–1·2	1·0–2·0	1000–500	5·1–7·2	7·7–10	9·6–13·6
Single Process Roving					
1·2–2·4	2–4	500–250	5·5–7·6	7·2–10·2	10–14
Yarn					
6	10	100	11·3	15	19·5
8	13·5	74	12·7	16·3	21
12	20	50	14·3	19	24·6
16	27	37	15·2	19	25
20	34	29·4	16·2	20·6	25
24	41	24·4	17·0	21·7	25·8
30	50	20	18	22·6	27·2
36	61	16·4	18·8	23·3	27·8
40	68	14·7	18·8	23·5	28·2

(*continued from page* 428)

The confidence limits indicate where the true value of the irregularity can be expected to lie. These confidence limits 95% have been chosen and calculated, based on random variation.

Example:

By means of the "Uster" Evenness Tester, the irregularity of a yarn has been determined as follows:—

Feed 8 yds./min. 10 readings at intervals of 30 seconds:

$U = 16\%$

According to our table, the confidence limit is, in this case, $\pm$ 0·05. We obtain thereby:—

$U = 16\% \pm 16 \cdot 0{\cdot}05 = 16\% \pm 0{\cdot}8\%$

Therefore, the confidence limits are:—

15·2% and 16·8%

This means that the average irregularity of the total bobbin lies with a certainty of 95%, between the values of 15·2% and 16·8%. It is essential to calculate the confidence limit where several bobbins are to be tested. In this connection, we would refer to the respective literature. It is then seen that, in most cases, 5 - 12 bobbins, cans, etc., will be required in order to obtain a reliable average value.

Significant differences:

Very often, the average irregularity is indicated too accurately (for instance U = 14·175%). Due to confidence limits within a test, or more particularly, within a whole group of tests (different bobbins), such an indication does not make sense.

Standard Values of the Irregularity Index I

Testing Material			Carded Cotton		
English	Metric	Tex	even	average	uneven
			%	%	%
Card Sliver					
0·14–0·18	0·24–0·3	4200–3300	5	8	10
Breaker Drawing					
0·11–0·18	0·19–0·3	5300–3300	6	9	14
Finisher Drawing					
0·18–0·28	0·3–0·47	3300–2100	5	8	12
Slubbing					
0·6–1·2	1·0–2·0	1000–500	4	5·5	7·5
Single Process Roving					
1·2–2·4	2–4	500–250	3	4	5·5
Yarn					
6	10	100	2·8	3·7	4·8
8	13·5	74	2·7	3·5	4·5
12	20	50	2·5	3·3	4·3
16	27	37	2·3	2·9	3·8
20	34	29·4	2·2	2·8	3·4
24	41	24·4	2·1	2·7	3·2
30	50	20	2	2·5	3
36	61	16·4	1·9	2·35	2·8
40	68	14·7	1·8	2·25	2·7

Which differences are now noticeable when processing further? In the case of yarns, this difference is approximately 10%: in other words, a yarn of 15% and a yarn of 15·5% will hardly be different in the further processes, whereas a yarn of 15% and one of 16·5% will behave differently. Therefore, it is recommended to carry out the test so accurately that a difference of 5%, i.e. one-twentieth of the value, can be recognized with certainty (see previous indication regarding confidence limit).

However, it is considerably different, if periodical variations exist (see literature regarding spectrographic analysis).

What conclusions do the U % or CV % permit?

Substantially, the U % or CV % means the irregularity of the respective processing stage. If we test a roving, the standard reached during this stage is shown by the average irregularity. However, very little can be said about the sliver from which this roving originates. The reason for this lies in a mathematical law, the so-called "square addition" of the irregularity. From the diagram—in particular, when measuring with the apparatus set to inert—the influence of the previous process can be seen much better. Even more suitable for this purpose, is the analysis by means of the Spectrograph.

Efficient apparatus:

The measuring apparatus should work accurately. In case of doubt, we would recommend that a calibrating yarn should be requested from Messrs. Zellweger Ltd. of Uster.

COTTON

Standard Values of the Irregularity of Scutcher (Picker) Laps

		very even	even	average	uneven	very uneven	extremely uneven
Mean linear irregularity	**U %**	1·6	2·4	3·6	5·2	6·8	8·3
Coefficient of variation	**CV %**	2·0	3·0	4·5	6·5	8·5	10·4
High - low range*	**R %**	8	10	15	25	32	40

*** High - low range = The highest and the lowest point of each yard.**

COTTON

Standard Values of the Irregularity of Ribbon Laps

		even	average	uneven
Mean linear irregularity	**U %**	2·2	3·5	7
Coefficient of variation	**CV %**	2·7	4·4	8·8
High - low range*	**R %**	11	17	35

*** High - low range = The highest and lowest point of each yard.**

NOTE.—Readers will undoubtedly be interested in the review by a well-known research worker on page 460.

Francolor Specialities

Compagnie Francaise des Matieres Colorantes—Francolor, of Paris, have introduced some new dyestuffs to augment the ranges at present available through the sole concessionnaires in this country Alliance Dye and Chemical Co. Ltd., Grecian Mill, Lever Street, Bolton, Lancs.

Acetazol Black JBZ is an azo dye for dyeing acetate cakes, and intended to definitely simplify the dyeing process whilst the maximum stability of the bath is guaranteed. This product resolves the problem of dyeing all qualities of acetate which are difficult to penetrate. It is also ideally suitable for the dyeing of cellulose triacetate.

Neutrogene Black J, a product said to increase the range of the Naphtazol-Fast Base combinations developed by neutral steaming, gives excellent results used, for example, as "outline black" with reactive dyes. The print pastes are noticeably more stable than those prepared with the earlier Neutrogene Black B. It is claimed that excellent yields are obtained, also that the colour has a good fastness to light, washing and chlorine.

A new vat dyestuff for all printing methods is Solanthrene Printing Brown 3R Paste Fine. This dyestuff is stated to have the following advantages: (a) non-tendering, (b) quick fixing, (c) gives level blotches and (d) does not change shade in artificial light.

Solanthrene Olive Green F-2J Neopowder is a homogeneous vat dye of yellower shade than Solanthrene Deep Green F-J and possesses similar excellent fastness properties. Pointing out that it is especially suitable for articles which are subsequently boiled out and bleached with chlorine (except with sodium chlorite) and with peroxide, the makers say that because of its splendid fastness properties, it is recommended for materials such as tent-cloths, furnishing fabrics, awnings and similar materials. It is also recommended where khaki shades are required, and may be applied by all normal processes. Its "neopowder" form makes it suitable for both dyeing in a reduced bath and for pigment padding processes.

A product similar to the well-known Solane Blue R is Solane Blue BJ. This product, however, gives a greener shade. The tintorial properties and fastnesses of the two brands are identical. Solane Blue BJ may therefore be used for economical medium and dark blue shades, particularly for overalls.

Chrome Fast Red JRL is a product which has a brighter shade than normal chrome reds. It has good levelling properties and a good fastness to light and to wet treatments generally. A good yield ensures economical working.

Ultra-Modern Draperies from Modern Metal

A NEW aluminium-and-fibre material which already has attracted broad interest in architectural and interior decorating circles has been introduced by the Hunter Douglas Division of Bridgeport Brass Co. The material was developed for use in draperies and window shades and has been named Flexalum woven aluminium.

Made of fireproof sculptured aluminium reeds loomed with yarns and threads, the material is highly versatile and equally adaptable for draperies, roll shades, room separators, backdrops and wall treatments. The material combines the appeal of high-style window fashion with the practical advantage of eliminating glare but admitting diffused light.

The aluminium reeds which are the basis of the new design are made of spring tempered alloy ·011 in. thick. The reeds are formed to a finished width of ·250 in. and depth of ·030 in. They have smooth edges, as burrs or other irregularities would cut warp yarns. The finish is of baked enamel and is capable of withstanding a 20% salt spray solution at 95°F. for 250 hours without blistering, corroding, chalking, changing colour or loss of adhesion.

On this base the company has developed several interesting and attractive designs which claim the advantages of permanent colour with long life, are flameproof and verminproof, and offer low maintenance and ease of operation. Although new to the market, Flexalum already has been employed in newly built or newly decorated hotels, apartment houses, hospitals and institutions of many kinds.

* *With acknowledgements to "Aluminium News," Northern Aluminium Co. Ltd., Bush House, Aldwych, London, W.C.2.*

Constructional Differences in Terry Jacquards

An explanation of the methods of operation, also the card cutting and designing techniques in modern machines made by British, American, German and Swiss firms. Constructional differences and special features are examined

By T. HARGREAVES

THE usual arrangement for weaving floral and other complex designs in terry cloths is to use a tappet or dobby loom to operate the ground ends and a double cylinder, double-lift jacquard to control the pile. A terry cloth with an overall fancy pattern seldom requires cross-borders to ornament it still further. Fancy cross borders usually demand a weave that is not a terry weave and necessitate the use of extra cylinders, usually on dobbies.

Having eliminated the necessity of such cross-border designs, it is possible to employ specially constructed jacquards for terry weaving and these cannot be used for other than terry weaves. They will, however, weave cloth such as the plain borders not having terry loops but which, in construction, is still the same weave as when terry loops are formed.

Whether the pattern is in reversible two-tone terry effects, or is one demanding blocks of terry on one face of the cloth and no terry loops on the opposite side, this special terry jacquard is ideal. It is a great time and card saver and simplifies painting of the designs on the squared paper and the card cutting operation. In addition, one card suffices where three cards were necessary in the normal system of jacquards. Furthermore, "off pick" troubles that prevent terry loops being formed, completely disappear. One card is one complete terry weave cycle and so cannot get off pick. As the cylinder is only turned every third pick to change the card to be presented to the selection needles, the slower movement increases the life of both the cards and the machine.

Figs. 1(a), 1(b), and 1(c) show the arrangement for adapting a standard jacquard to weave terry cloths. Fig. 1(a) is the standard arrangement

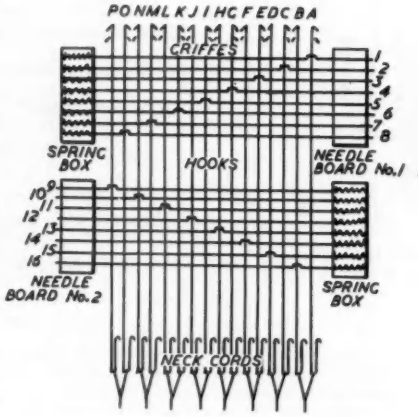


Fig. 1(a)

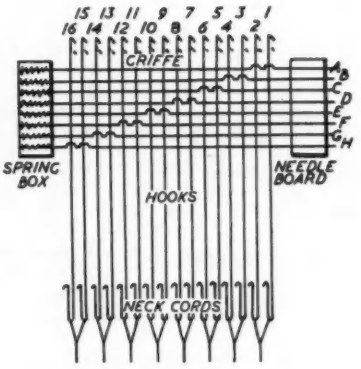


Fig. 1(b)

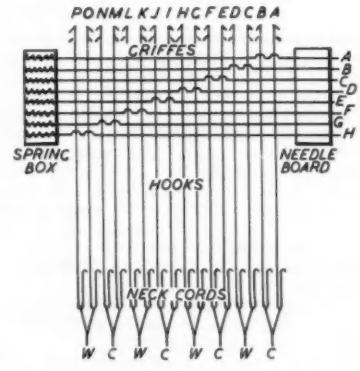


Fig. 1(c)

for a double-lift, double-cylinder machine, one card to each pick. Fig. 1(b) is that for a double-lift, single-cylinder machine, also one card to each pick. Fig. 1(c) is the arrangement to suit the weaving of terry pile fabrics whereby one card serves for three picks or one terry loop weave cycle.

In Fig. 1(c) arrangement the needles are taken from Fig. 1(b), the hooks and griffes from Fig. 1(a), but the length of the hooks are as in Fig. 1(b). One cylinder only is used and mechanism must be arranged so that the cards are changed between the third pick of one terry cycle weave and the first pick of the next cycle. The neck cords combine the two hooks operated by each needle of the Fig. 1(c) arrangement. Each neck cord controls one line of harness. Those marked "W" are the harness lines controlling the white pile ends and "C" the lines controlling the coloured pile ends when weaving reversible two-tone terry cloth.

Method of Operation

To produce a terry loop on top of the cloth the pile thread must be lifted as follows: first pick—up; second pick—down; third pick—up. To produce a terry loop on the underside of the cloth the pile must be lifted as follows: first pick—down; second pick—up; third pick—down. If a hole punched in the pattern card is presented to needle A, hook A will be engaged by the griffe. The griffe

rising lifts the hook and the ends so controlled; that is for the first pick.

The same pattern card presented for the second pick finds the griffe under hook B rising, but this hook is turned the opposite way to hook A. As the same punched hole in the card is still there, as for the first pick, and hook B is also controlled by needle A, the hook B will not be engaged by its now rising griffe. The griffe under hook A is now descending. Hooks A and B both control the same pile thread, being connected by a tug cord. Therefore, the pile thread is not lifted; it is lowered. For the third pick, the same punched hole in the card is again presented to needle A. Hooks and griffes are again as they were in the first pick. Hook A is lifted by the rising griffe. Therefore, the pile thread is lifted.

The cycle for a terry loop on top has been completed. First pick—pile thread lifted; second pick—pile thread lowered; third pick—pile thread lifted. But if instead of a hole in the card being presented to needle A for the three picks, a blank were presented, the reverse lifting would have been accomplished and the loop would have been underneath and not on top.

If it is desirable to have the terry loop from the same pile thread again on top of the cloth for the next cycle of terry weave, namely the fourth, fifth and sixth picks, we shall have to present a blank in the card and not a hole, because this time the griffe under hook B will be rising. In order that hook B shall be engaged by its griffe it is necessary to push the needle A. This necessitates a blank in the pattern card. A little thought will show that this will cause the pile thread to be lifted-lowered-lifted, during the three picks that the second card was presented.

Imagine that a reversible two-tone pattern with equal number of loops on each face of the terry towel has to be woven. The pattern is brought out by interchange of colour and white pile loops. Suppose it is decided to use a 28-dent per in. reed and 48 picks per in., and that the cloth has to be bleached after weaving. The shrinkage from yarn spread in the reed to woven cloth width, and additional shrinkage due to bleaching, will give us 32 pile ends per in.; 16 of these will show on the face and 16 underneath. 48 picks per in. of cloth equal 16 terry loops, because 3 picks are needed to produce one terry loop lengthwise in the cloth. Design paper in the proportion of 16 to 16 is therefore required. Keeping to these proportions, 8×8 paper can be used if using a 400 jacquard, or 12×12 paper if using a 600 machine. Each square will represent 2 pile ends —one on top and one beneath. The same square lengthwise represents 3 picks or one terry loop. The full horizontal line of squares would be cut on one card, this card serving for 3 picks.

Card Cutting and Designing

The pattern painted in colour on the design paper conforms to the design to be produced on the face of the cloth. In this particular case the design is to be coloured loops on a background of white loops. Where no colour is to show on the face of the cloth the design paper will not need to be painted.

Each square represents two pairs of hooks in the jacquard. These two pairs control two pile ends, one for the face, and one for the loops on the underside of the cloth. Where the first square is painted a hole is cut and the next position is left blank. The hole will cause hooks A and B which control a coloured pile end (see Fig. 1(c)) to weave a coloured loop on top. The blank will cause hooks C and D, which control a white end, to weave a white loop underneath.

It must be remembered that the next row of squares (horizontally) to be cut on No. 2 card, must be cut in the opposite manner to that for No. 1 card because the opposite griffes will be rising for the first and third picks. However, cutting is simplified considerably if the squares vertically are numbered 1-2-3-4, etc.

All odd numbered lines must be cut first. If colour shows on the design paper, cut a hole, then leave a blank. If white shows (i.e., unpainted), leave a blank first, then cut a hole. Continue until the whole pattern is cut, but only cutting every alternate line, i.e., the odd numbered lines. Turning again to the beginning of the design paper, cut the even numbered rows this time but if colour shows, leave a blank first, then cut a hole. If white shows, cut a hole, then leave a blank. Lace the cards in the order 1-2-3-4, etc., i.e., first a card from the odd numbered cards and then one from the even numbered cards.

In the case of blocks of terry contrasting with blocks of no terry (tapestry-like), the painting and cutting instructions are simpler.

Odd Numbered Cards.—Cut two holes for each square where painted. Leave two blanks for each unpainted square.

Even Numbered Rows.—Leave two blanks for each painted square. Cut two holes for each unpainted square.

The ground threads are carried on healds operated by tappets or a dobby. Bars of cloth for borders without loops are obtained in the usual manner by manipulation of the terry motion so as to beat-up every pick, instead of three picks as for terry loops.

Whilst the use of this type of jacquard, where one card serves for three picks, will prevent "off-pick" troubles, care must be taken to always turn back two cards, or multiples of two cards, if and when it is necessary to do so. Otherwise the odd numbered card will be presented to the jacquard selection needles when the even numbered card is desired, or conversely. If that should happen the pattern will be reversed from the face to the underside of the cloth.

The Dracup Terry Jacquard

In the re-arrangement of needles, hooks, and griffes shown in Fig. 1(c), there are 16 hooks controlled by 8 needles, and these 16 hooks control 8 lines of jacquard harness. Whilst using the same principal of operation as outlined in Fig. 1(c), Samuel Dracup and Sons Ltd. jacquard machine makers, of Bradford, Yorkshire, England, have accomplished the object by a different system. They have used the needles of a single cylinder, single-lift, in conjunction with the griffes of a single cylinder, double-lift machine. There are 8 hooks controlled by the 8 needles and these 8 hooks are changed into 4 pairs of hooks by the neck-cord arrangement. These 4 pairs of hooks control 4 lines of jacquard harness. Although it takes a 200-needle - 200-hook machine to give a 100 hook value, it is an extremely efficient arrangement which meets admirably the requirements of terry weaving. One card serves for 3 picks.

Fig. 2 shows the arrangement of one pair of hooks controlled by a pair of needles. These are shown for the first, second and third picks of the normal terry weave to produce a loop on the face of the cloth. Fig. 3 shows the arrangement for the next three picks which will also produce a terry loop on the face. It must be noted that this second set of three picks is controlled by card No. 2 which has been cut in an opposite manner to card No. 1, yet both cards are to produce a terry loop on the face. card No. 1 has a blank against the top needle in the sketch, Fig. 2, and a punched hole opposite the lower or companion needle. The blank pushes the needle so that the left-hand hook is engaged by the rising griffe raising

the pile end for the first pick. On the second pick, the punched hole will not allow the right-hand hook to be engaged by the other griffe which is now rising and as the left-hand griffe is lowering the same pile end is now lowered. For the third pick the hooks and pile end are lifted as for the first pick, thus completing the three-pick terry weave cycle for a loop on the face.

The card is then changed and a punched hole is now opposite the top needle and a blank opposite the companion needle which, of course, is in contrast to the cutting for card No. 1. This time the right-hand griffe is rising and the blank opposite the lower needle in the sketch causes the right-hand hook to be raised. The loop is formed by this lifting in conjunction with the opening and closing of the reed by the terry motion, and the loop forms between the third and fourth picks or between the last or third pick of one set of three picks and the first pick of the next set of three picks. A blank in the card pushes the hook over the rising griffe to lift the end on the first and third selections for each card presented.

If, however, the positions of the blanks and punched holes were reversed on the two cards, the loops would form on the underside instead of on the face. Therefore, as for Fig. 1(c), the cards should be turned back in twos or multiples of two, if and when necessary, or reversing of the pattern from face to underside will occur.

Special American Jacquard

Specially built by Crompton and Knowles for weaving terry cloth, this jacquard like its British counterpart, has each pattern card serving for three picks. It also has a special re-arrangement of hooks. It works on a triple-lift principle, having three griffes instead of two, but as regards joining the hooks by the neck cords, the principle is as for a double-lift. The three griffes are set to work at 120° apart, giving three separate lifts.

Only one cylinder is used. The drive is from the loom crankshaft by chain to an overhead machine drive. The overhead drive consists of bevel gears and three eccentrically driven lifting rods having Randall joints. The three griffes are raised and lowered by fulcrumed cast iron arms which, in turn, are operated by eccentrically driven lifting rods also adjustable to suit the amount of lift desired. All these overhead connections are at the right-hand side of the loom, thereby eliminating most of the danger of oil dropping on to the cloth.

The movement of the second griffe operates the card cylinder in addition to its other duties. The card cylinder is at the left side of the loom, and the cards hang clear of any mechanism. In addition to the card savings effected by having one card serve for three picks, this jacquard is also fitted with repeater mechanism which enables the same card to be used for weaving as many terries of that particular pattern as desired. It is a valuable card saver when weaving designs with considerable plain terry in them, such as in name towels.

In operation, the lift of the pile ends is the same for the first and third picks of the terry weave, while the lift for the second pick is the reverse of the first and third. Thus a terry loop on top has the pile end lifted-lowered-lifted for the three picks forming the terry weave cycle. A terry loop on the underside is the opposite—lowered-lifted-lowered.

Figs. 4 and 5 show the arrangement of hooks and needles. One of the hooks is a double hook, formed by soldering 7 ins. of another hook, turned opposite, to the top of the long hook. The full length of the hook is about 33 ins. All double hooks raised by the second griffe cannot be raised by the third griffe, but all double hooks not raised by the second griffe will be raised by the third griffe.

The three griffes have an approximate movement of $5\frac{1}{2}$ ins. to allow an approximate lift of $3\frac{3}{4}$ ins. to the hooks:—

Lift of hook	**$3\frac{3}{4}$ ins.**
One-third the lift of the hooks to allow a one-pick dwell	**$1\frac{1}{4}$ „**
Clearance between hooks and griffes to allow time for proper indication	**$\frac{1}{2}$ „**
Total ..	**$5\frac{1}{2}$ „**

The extra travel of $1\frac{1}{4}$ ins. by each griffe is *below* the hooks, after they have been rested on the bottom plate; thus a one-pick dwell for each griffe. Fig. 5 shows the position of the needle and hooks when a blank in the card is presented. Fig. 4 is in the position when a hole in the card is presented.

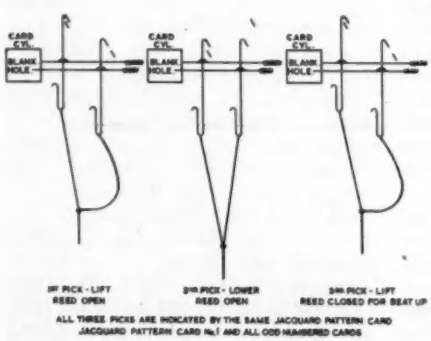
One card can be made to serve for three picks in the following manner. Referring to Figs. 4 and 5, A is a single hook, B is the double hook, C is the cylinder. The needle is shown at D. Fig. 4 shows hole in card presented to the needle:—

First pick—Griffe No. 1 rises, engages single hook, and lifts it.
Second pick—Griffe No. 1 lowers, lowering single hook. Griffe No. 2 rises, but does not engage double hook.
Third pick—Griffe No. 2 lowers; Griffe No. 1 remains down. Griffe No. 3 rises, engages double hook and raises it.

Therefore, the pile threads controlled by these hooks have been lifted-lowered-lifted which is the weave cycle for a terry loop on top of the cloth.

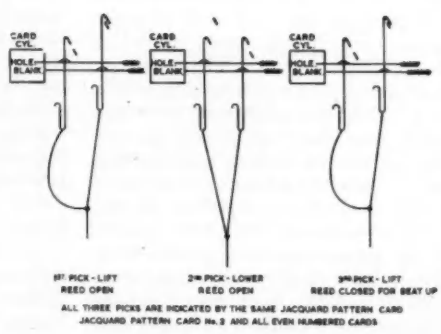
Fig. 5: blank in card presented to needle:—

First pick—Griffe No. 1 rises, does not engage single hook.
Second pick—Griffe No. 1 lowers; Griffe No. 2 rises, and engages double hook, raising it.
Third pick—Griffe No. 2 lowers, lowering double hook. Griffe No. 3 rises, but does not engage double hook. Griffe No. 1 remains down.


CARD CYL.
BLANK HOLE
1ST PICK - LIFT REED OPEN
2ND PICK - LOWER REED OPEN
3RD PICK - LIFT REED CLOSED FOR BEAT UP
ALL THREE PICKS ARE INDICATED BY THE SAME JACQUARD PATTERN CARD
JACQUARD PATTERN CARD No.1 AND ALL ODD NUMBERED CARDS

(left) Fig. 2. Movement of hooks in the Dracup arrangement of a jacquard for 3-pick terry weaving; terry loop on face of fabric

(right) Fig. 3. Movement of hooks in the Dracup arrangement of a jacquard for 3-pick terry; terry loop on face of fabric


CARD CYL.
HOLE BLANK
1ST PICK - LIFT REED OPEN
2ND PICK - LOWER REED OPEN
3RD PICK - LIFT REED CLOSED FOR BEAT UP
ALL THREE PICKS ARE INDICATED BY THE SAME JACQUARD PATTERN CARD
JACQUARD PATTERN CARD No. 2 AND ALL EVEN NUMBERED CARDS

The pile ends controlled by these hooks have been lowered-lifted-lowered, thereby completing the weave cycle for a terry loop on the underside of the cloth. If it is necessary to turn the pattern cards at any time, then any number which equals the number of terry loops removed from the woven cloth may be turned back. This jacquard is not affected by odd-numbered or even-numbered cards being presented to the selection needles. All cards are cut to the same instructions.

This smooth running and very efficient jacquard is available in 624- and 104-hook capacity, and is specially built for three-pick terry weaving. It is not suitable for other types of terry nor for any other cloths. Capable of being run at high speeds the cylinders are equipped with roller bearings and impregnated wood bushings are used in all the principal bearings.

Card cutting is much simplified, as the cards are cut for the first pick only of the three picks in the terry weave; the jacquard automatically takes care of the second and third picks. Hence the card cutter is not compelled to exercise the alertness necessary, when cutting cards for terries woven by the use of the ordinary double lift jacquard. The makers recommend that lingoes be not lighter than 10 per lb. It is for mills to decide their own methods and excellent results are being obtained with lingoes 20 per lb.

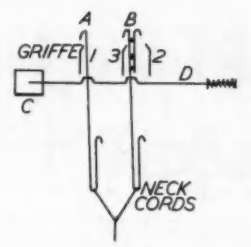


Fig. 4

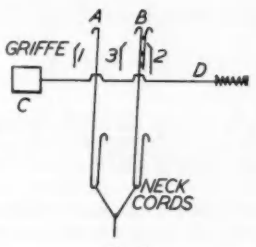
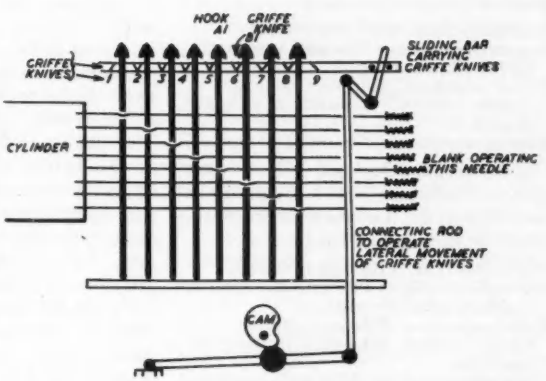


Fig. 5


HOOK A1
GRIFFE KNIFE B1
GRIFFE KNIVES
1 2 3 4 5 6 7 8 9
SLIDING BAR CARRYING GRIFFE KNIVES
CYLINDER
BLANK OPERATING THIS NEEDLE
CONNECTING ROD TO OPERATE LATERAL MOVEMENT OF GRIFFE KNIVES
CAM
Fig. 6. German arrangement of hooks, needles and griffes in jacquard adapted for weaving 4-pick terry fabrics. One pattern card serves for 4 picks. 1—single griffe knife. 2 to 8—double griffe knives. 9—single griffe knife but the angle is in the opposite direction to No. 1. All hooks have double or two-way direction heads

Continental Methods of Adapting Jacquards

So far, two British and one U.S.A. method have been described for adapting jacquards for the purpose of weaving terry and all three were for the standard three-pick weave. In contrast, however, the four-pick terry is much used as the standard weave on the continent.

In the 1951 issue of "Melliand Textilberichte" an article by H. Petzold described the principles of a four-pick terry jacquard where each card served for four picks.

With this arrangement there are eight needles controlling eight hooks and each hook is a double-headed hook that can be engaged by either of two griffe blades. There are nine sets of griffe blades and the first and ninth griffe blades are single. The other seven have double lifting knives, so there are really sixteen griffe knives to operate the eight double-headed hooks. This type of construction has a value of eight needles controlling sixteen hooks lifted by sixteen griffe knives.

A single cylinder, which presents each card for four picks, is so arranged that the pattern card is turned between the third and fourth picks of the four-pick terry weave cycle. One card then serves for the fourth pick of one terry loop weave cycle and the first, second and third picks of the next terry loop weave cycle.

The griffes are given a lateral movement by an eccentric between the second and third selection of the hooks by the card, so that a mutual binding of both face and back loops is obtained. This side movement is reversed to bring the griffes back to their normal positions between the third and fourth selection of the hooks by the same card. The ground weave is controlled by tappets or a dobby.

Fig. 6 illustrates the arrangement of hooks, needles, and griffes in this German-made (maker unknown) jacquard machine. The hook A^1, which will remain down until the griffes are moved by the eccentric, will then be engaged by the griffe knife marked B^1 and raised. The other hooks which had been raised are left down when the lateral move of the griffes take place.

To more clearly illustrate the four-pick terry weave produced by this German jacquard and the relationship of weave to pattern card—which is changed one pick out of sequence—a cross-section of the weave is shown in Fig. 7. Ground weave and an alternative ground weave are shown separately.

Only the pile ends are controlled by the jacquard and in this diagram showing the weave, the four-pick terry cycle is shown under the pile loop weave by the figures 1-2-3-4 between dotted lines. Over the pile loop weave between the solid lines are the figures 1-2-3-4 also. These represent the four picks controlled by one pattern card. The first pick from the card is actually the fourth pick of the terry weave cycle. In following the continuous line representing a coloured pile loop, the card is presented to form a coloured pile end loop on the face of the cloth. Punched hole in card:—

1st selection. Pile end raised.
Second selection. Pile end raised. Griffe blades now slide towards the card cylinder and engage the hooks of all those pile threads previously left down. Those pile ends previously lifted will now be left down as the Griffe blade which lifted them has been moved away.
Third selection. Pile end lowered. The Griffe blades now slide back to their original position.
Fourth selection. Pile end raised.

Card is changed and is presented to form another coloured pile end loop on the face of the cloth. Punched hole in card:—

First selection. Pile end raised.
Second selection. Pile end raised. Griffe blades moved.
Third selection. Pile end lowered. Griffe blades returned to original position.
Fourth selection. Pile end raised.

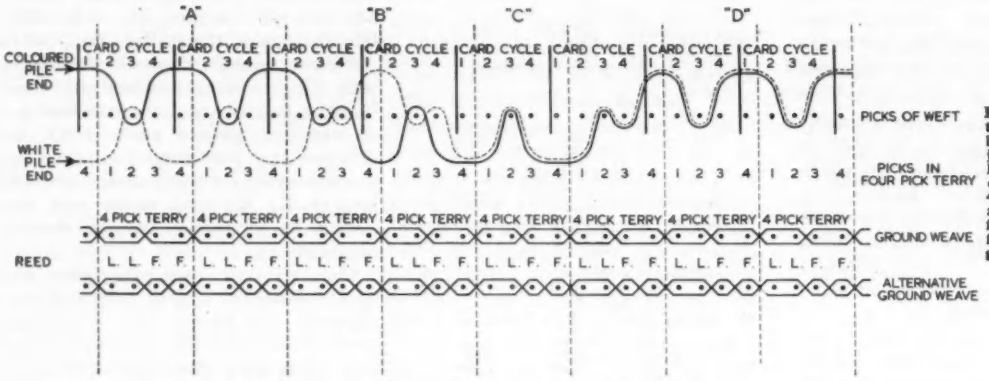


Fig. 7. Four pick terry weave produced by German-made jacquard. A punched hole in the pattern card produces the 4-pick weave to form a terry loop on the face and a blank forms the weave to give loops on the underside

A—Coloured end forming terry loop on face; white end forming loop underneath
B—White end forming loop on face; coloured end loop underneath
C—Both coloured and white ends forming loops on underside of cloth
D—Both coloured and white ends forming loops on face

Card changed again. This time presented to form a coloured pile end loop on the underside of the cloth. Blank or unpunched card:—

First selection. Pile end lowered.
Second selection. Pile end lowered.
Griffe blades moved.
Third selection. Pile end raised.
Griffe blades returned to original position.
Fourth selection. Pile end lowered.

Card again changed. This time presented to again form a coloured pile end loop on the underside of the cloth. Blank or unpunched card:—

First selection. Pile end lowered.
Second selection. Pile end lowered.
Griffe blades moved.
Third selection. Pile end raised.
Griffe blades returned to original position.
Fourth selection. Pile end lowered.

It will be observed that all terry loops float over three picks should they be successively woven on the face of the cloth, or float under three picks when successively woven on the underside. When a loop changes from face to underside, or from underside to the face, the loop float is only over or under two picks. This compares favourably with the three-pick terry weave whose loops float over or under two picks when successively woven on the same side, but only have a float over or under one pick when the loop changes from face to underside or conversely.

Because of the time needed to move the griffe blades laterally between the 2nd and 3rd also between 3rd and 4th hook selections it is doubtful whether this type of jacquard can be run at high speeds. The movement of the reed by the terry motion is shown by the letters L-L-F-F. Two loose or open reed positions and two fast or closed reed positions in each four picks of the terry weave cycle on F-L-L-F in that order for the four picks controlled by one jacquard pattern card.

Whilst the German-made jacquard is designed for weaving four-pick terry it appears that it could be used to weave three-pick terry fabrics. The eccentric moving the griffes laterally would need to be re-shaped and have a three-pick cycle instead of four. The card would serve for picks 1-2-3 of the normal three-pick terry. The lateral movement of the griffes would take place between the 1st and 2nd hook selections and back to the normal griffe position between the 2nd and 3rd hook selections by the same card. This would change the order of griffe rising for the even-numbered cards as against those for the odd-numbered cards.

The arrangement would necessitate a change in card cutting instructions, in that a punched hole forms a terry loop on the face on odd-numbered cards, but a blank (unpunched card) will be needed to form a terry loop on the face for the even-numbered cards. This is the card cutting system used in Figs. 1 and 2 which depict the two British methods.

In comparison the German method looks rather complicated with possibly a much slower running speed compared with the simplicity of construction, and ease of operation, of the two British machines. Only the C. and K. terry jacquard has the same cutting instructions for both odd- and even-numbered pattern cards when weaving three-pick terries where one card serves for three picks. Should any of these terry jacquards be desired to weave names of institutions, clubs, hotels, shipping lines, hospitals, etc., in panels down the terry fabric instead of all over fancy designs then usually only 40 to 100 hooks will be necessary. If intended for this class of work a 100-hook or at the most a 200-hook machine would be ideal. For all over terry pile effects a 400- or 600-hook machine is necessary.

Swiss Terry Jacquards

At the recent A.T.M.A. Textile Machinery Exhibition in Atlantic City, U.S.A., a Swiss, single shuttle, automatic terry loom was exhibited, and equipped with an electro-magnetic name weaving apparatus system "Huttwill." A chain drive from the loom to the jacquard is supplemented by an instrument panel situated on the floor alongside the loom which appears to be about 3 ft. wide.

This instrument panel contains a series of 44 contact rollers, each having its own function (letter, punctuation, fancy border weave effects, etc.), the combination of the functions desired in the weaving of the name is done by plugs pushed into the holes of the control box cover which governs the action and hook selection of the jacquard, through the electric-magnetic controls. Evidently there are duplicate controls in this instrument panel, one set carrying the mechanism for one name and the second set held in reserve, but fully arranged to weave the name required for the next order at the turn of a switch.

* * *

Visiting South Africa

The export effort is being furthered by L. Linz and Sons Ltd., Manchester (Unity cutting machines) whose chairman, Mr. B. Linz, sails for South Africa on December 22, to enlarge the existing machine exports in that market.

* * *

Change of Address

The weaving machine department of Sulzer Bros. (London) Ltd., is now at 61a Alderley Road, Wilmslow, Cheshire. All orders and enquiries are handled by Mr. J. P. Mackenzie, A.M.C.T., from this office.

Nylon and Low Flammability Standards for Apparel Fabrics*

Fabrics made only from nylon fibres and containing no other material (e.g., finish, dye, coating) do not propagate flame under normal conditions because the melting point of nylon is well below its ignition temperature

From Nylon Outlook

By B. ROBERTS

ACCIDENTAL domestic burns are often both caused and aggravated by the inflammability of clothing. In a survey of more than 1,000 casualties admitted (1951-5) to the Birmingham Burns Unit, three-fifths of the patients sustained their injuries in home surroundings. Of these domestic cases, one half were due to clothes catching fire; and among deaths caused by burning nearly one quarter (22%) involved clothing. In the face of these published facts fire hazards are yet commonly disregarded in the selection of fabrics for wearing apparel.

A committee of the British Standards Institution considering the flammability of apparel fabrics in relation to domestic burning accidents reported (1957) on the fire risk attending long, loose-fitting clothing—particularly when worn by children and elderly people. The same committee published information about flame-proofing and durable flame-resistant processing. While no fabrics made from natural or regenerated fibres, except asbestos, are inherently flame-proof, they can all be treated to increase their flame-resistance. Pure nylon, however, because it does not propagate flame, needs no additional treatment, which on cotton and rayon (for example) unfortunately always increases the cost and almost always impairs the handle.

Against this background, and in the light of British legal enactments the requirements of fabrics for which some degree of safety from fire is claimed, this article describes the behaviour of nylon apparel fabric in B.S.I. tests for low flammability.

Standards of Flammability

The classification "flame-proof" as defined by the British Standards Institution normally applies to industrial fabrics and protective clothing in circumstances where fire hazards may be an unavoidable part of working conditions. Separate British Standards covering apparel fabrics which can be considered safe in ordinary wear use the term "low flammability."

Typical Results

All the results we quote are of tests in accordance with Method A—the vertical strip test—of B.S. 2963: 1958, which is the test specified for low flammability.

Six specimens of the fabric are tested. If none of the six strips burns for 10 ins. or more, the result is reported as "flame not propagated." If any strip burns a distance of more than 10 ins., but none burns as much as 60 ins., the result is reported as "self-extinguishing." If any strip burns 60 ins. or more, the fabric is given a "flame-resistance rating"—a number which is inversely proportional to the flame speed. A high rating implies slow burning, a low rating implies quick burning, so that the rating number is directly related to the time available for extinguishing flames or discarding clothing. The order of classification from bad to good is therefore:

1. Low Flame-Resistance Rating.
2. High Flame-Resistance Rating.
3. Self-Extinguishing.
4. Flame not propagated.

A performance requirement of "low flammability" fabrics is that they shall have a flame-resistance rating of 150 or more, or shall be reported self-extinguishing or flame not propagated.

(No fabric could be classified as "flame-proof" on the results of this test alone. The flame-proof test requires a slightly different arrangement of specimen and test flame, but again six specimens are tested. No specimen must burn for more than 8 secs. after the igniting flame has been

Table 1. Flammability of Fabrics

Description	Weight (oz./sq. yd.)	Composition	Flame-resistance rating
Lingerie fabric	2·6	Acetate fabric	60
Dress fabric	6·1	Viscose rayon	65
Dress fabric	3·5	Cotton	38
Dress fabric—drip-dry	3·8	Cotton	43
Winceyette	3·6	Cotton	40
Winceyette, "Antiflam" treated	6·1	Cotton, treated	F.N.P.
Dress fabric	3·5	60% cotton/ 40% wool	42
Shirt fabric	3·4	35% cotton/ 65% nylon	69
Dress fabric	3·6	Wool	115
Dress fabric	6·3	Wool	240
Coat fabric	13·2	Wool	F.N.P.
Blouse or lingerie fabric	0·9	Nylon	F.N.P.
Dress fabric	1·4	Nylon	F.N.P.
Blouse or shirt fabric	1·9	Nylon	F.N.P.
Dress fabric	2·1	Nylon (Taslan)	F.N.P.
Dress fabric	2·1	Nylon (Taslan)	S.E.
Dress fabric	2·4	Nylon	F.N.P.
Blouse fabric	2·9	Nylon	F.N.P.
Blouse fabric	2·9	Nylon	F.N.P.
*Lingerie fabric, brushed	3·8	Nylon	F.N.P.
Upholstery fabric	10·0	Nylon	F.N.P.
Rainwear, polyurethane coated	2·7	Nylon + coating	F.N.P.
Rainwear, "Hypalon" coated	3·1	Nylon + coating	236
Rainwear, silicone proofed	3·3	Nylon + coating	184

* A warp-knitted fabric. All others in the list are woven.
F.N.P. — Flame not propagated. S.E. — Self-extinguishing

* *With acknowledgements to "Nylon Outlook"—No. 8, published by British Nylon Spinners Ltd.*

removed. The length of charred or melted material must not exceed 4½ ins. on any one specimen, nor must the average length exceed 3½ ins. Thus any flame-proof material would be classed as "flame not propagated," if tested to B.S. 2963, but a fabric classed as flame not propagated could not necessarily be called flame-proof.)

Table 1 shows results for various fully finished commercially available fabrics (mostly dyed or printed), tested by the method for low flammability. The purpose was to compare a range of materials in new condition, not to assess the durability of any finish; the fabrics had therefore not been dry-cleaned or washed.

Behaviour of Nylon Fabrics

Flame-Resistance Properties.—Nylon polymer can be ignited and under some conditions (i.e. in a conflagration) may burn. However, fabrics made only from nylon fibres and containing no other material (e.g. finish, dye, coating) do not propagate flame under normal conditions because the melting point of nylon is well below its ignition temperature.

When a flame is applied to the lower edge of a vertical strip of such a fabric, the nylon melts and burns with a very small flame so long as the igniting flame is kept in contact with the edge of the strip. Molten polymer drops from the strip and then ceases to burn. Within a few seconds of removing the igniting flame, burning ceases because the burning polymer has dropped away. If the igniting flame is held in contact with the lower edge of the strip and the position of the flame is fixed, as in the tests, then the fabric will melt and at first burn with a very small flame. As it shrinks from the igniting flame it stops burning. Light-weight fabrics retract from the flame more rapidly than heavier fabrics.

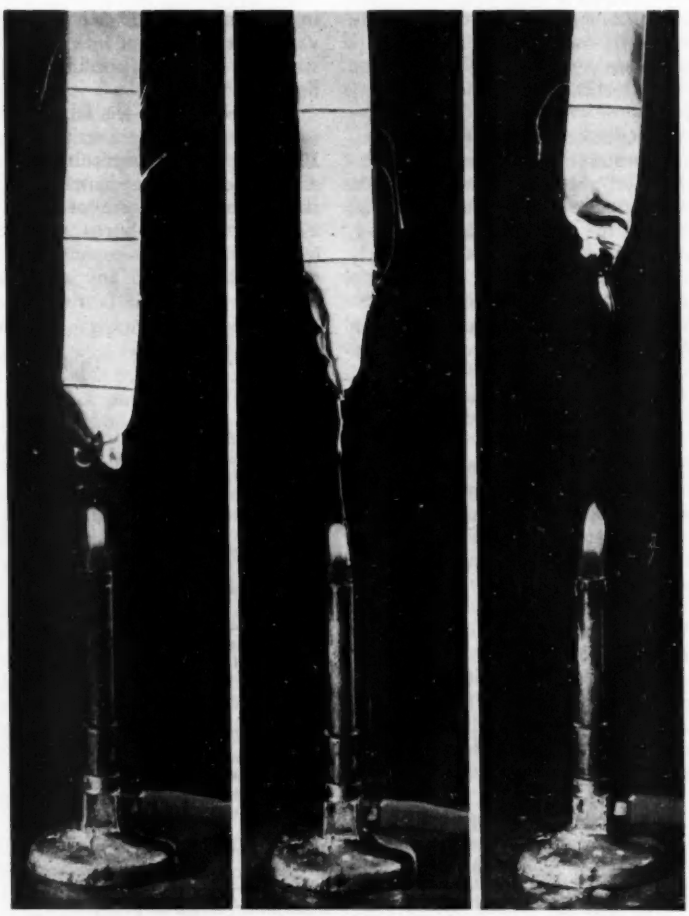
Nylon fabrics containing added materials (finishes, chrome dyes, coatings etc.) do not necessarily behave in this way, and may propagate flame. Changes in flammability are of two sorts. The added material may be inflammable and burn before the nylon has time to melt and fall away, or may, on the contrary, strengthen the fabric so as to support the burning nylon and ensure propagation of the flame. There is sometimes difficulty in distinguishing between these two effects, but nylon nets stiffened with melamine or urea formaldehyde resins are clear examples of the second sort, as these resins have a high melting point but are usually considered non-inflammable.

When tested for flame-resistance, the nylon polymer ignites but, because the melting point of the resin is higher than that of the nylon, the fabric immediately above the flame does not weaken as much as usual and continues to hold up burning polymer. Nowadays nylon nets can be stiffened with non-inflammable low melting point resins. Such resins do not appreciably strengthen the fabric at the melting point of nylon and so the fabric behaves as though it were pure nylon, dropping the burning polymer.

To sum up: the flammability of untreated pure nylon fabrics is very low. This property is not affected by some treatments or finishes, but others reduce flame resistance. So, before a particular fabric can be classified it must be tested to the specification, which further requires that tests be done both before and after washing. (We know, however of no nylon fabric whose flame-resistance property is worsened by washing.)

Burning Accidents.—In a common form of burning accident, the edge of a garment is swept into an unguarded fire and the wearer instinctively moves away or snatches the garment from the fire. Nylon fabrics in these circumstances do not propagate flame and in fact afford a high degree of safety. The worst that is likely to happen is that the wearer sustains localized burns from drops of molten polymer—a much less grave hazard than extensive injury from the spread of flame over a whole garment. In the conditions frequently reported where an elderly person, living alone falls on a fire and is unable to get up, burns sustained directly from the source of heat must obviously be severe. Even here there is some gain, if the extent of flame spreading is limited. It should be appreciated, however, that a nylon undergarment does not necessarily reduce the risk of burns when another inflammable garment catches fire during wear.

(*continued on page* 440)



Nylon test strips photographed at 3, 8 and 15 secs. after gnition at the lower edge

Water Soluble Lubricants for Woollen Carding

A new series of fibre lubricants are claimed to possess a number of important properties which, on technical grounds, should enable them to become quickly accepted for processing wool and man-made fibre blends

By S. DOBSON, A.R.I.C., A.T.I.*

A SERIES of synthetic, water-soluble fibre lubricants has recently been made available in the U.K. under the name "Oxitex." (registered trade mark applied for) These materials, which are polyoxyalkylene derivatives, are finding particular application as lubricants to facilitate carding and spinning on the woollen system.

Traditionally, the U.K. woollen industry uses oleines which, depending on the quality of material being processed, vary from almost pure oleic acid to the lowest recovered oils, dark in colour and containing less than 30% saponifiable material. As processing aids the oleines serve a dual purpose providing lubrication in carding and spinning and being conveniently converted to soap during scouring or milling. As lubricants, however, they function only at relatively high concentrations and further, have a tendency to induce corrosion of equipment with the additional disadvantages of instability and variability in quality. For modern processing their traditional advantage of quick and easy saponification with alkali has progressively proved their biggest drawback. Soap residues are difficult to rinse from yarn and woven cloth and unless completely removed may be responsible for residual odour and dyeing faults. Free alkali will yellow and cause fibre breakage to wool. It will also reduce the strength or even attack certain of the fibres used in modern wool blends.

Over the last twenty years attempts have been made to replace oleines with emulsifiable mineral oil blends but, in general, the woollen trade still has a strong prejudice against these products based on past experience. Numerous patents have been filed giving combinations of emulsifying agents. These include refined petroleum sulphonates, fatty acid esters, and ethylene oxide condensation products. Some woollen manufacturers blend their own products from mineral oil and selected non-ionic surface active agents. These mineral oil blends, applied neat or in emulsion form have been found to be excellent lubricants for wool. They do not form lime soaps with slipe wools and may be removed by neutral or mildly alkaline scouring liquors. However, in emulsion oiling unless a stable emulsion is formed, neat mineral oil may be thrown out during processing.

Furthermore, some of the emulsifying agents commonly used have been shown to cause serious deterioration of leather tapes and rubbing aprons. In some cases special scouring techniques have had to be evolved for wool blends containing a high natural grease content. It is generally agreed that mineral oil blends have to be formulated with a certain range of processing conditions in mind and as such are not sufficiently versatile.

In the development of the "Oxitex" lubricants, full advantage has been taken of their chemical stability, lack of rancidity, non-staining and non-corrosive properties, thus eliminating the disadvantages of oleines or mineral oil blends. Additionally, they possess some anti-static properties and are essentially harmless physiologically. The outstanding quality, however, that has stirred the imagination of the woollen spinner and manufacturer is the ability of these lubricants to form, by simple dilution with water, clear stable solutions of suitable viscosity for lubrication. Furthermore, they may be easily removed from processed textile materials by water alone.

Mill Trials with Water-Soluble Lubricants

Trials using the "Oxitex" range of lubricants have been carried out extensively in the laboratory and in woollen processing mills over the last two years. It was established that because of the superior spreading properties of these products they can be successfully used at quite low concentrations. For instance, 2 - 4% on 100% wool and 1 - 2½% on man-made fibre blends, satisfy all the requirements for efficient lubrication in carding and spinning. Without altering established mechanical processing conditions, all types of yarn can be produced which are uniform in count, strength and twist. The fact that the lubricant does not combine with blend contaminants enables the latter to fall more readily beneath the card giving rise to cleaner processing and higher blend yields.

Careful examination of card clothing, condenser leathers and aprons shows no deleterious effects after months of continuous processing which confirm laboratory tests.

To satisfy the varied requirements of woollen processing, two products were finally selected. "Oxitex" 10 was found to be entirely suitable for use with clean wools (and other natural protein fibres) or blends of these with man-made fibres. "Oxitex" 20 possesses suitable characteristics for use with blends containing more

Table 1 Physical Properties of "Oxitex" Lubricants

PROPERTY	"OXITEX" 10	"OXITEX" 20
Colour	Colourless to pale yellow. Free from sediment	Colourless to pale yellow. Free from sediment
Solubility in water	Complete	Complete
Water Content, %wt., max.	1·0	0·5
Alkalinity (as KOH), %wt., max. ..	0·025	0·05
Acidity (as acetic acid) %wt., max.	0·05	0·1

* *Shell Chemical Co. Ltd.,*

than average grease content. The physical properties of these two grades of "Oxitex" polyoxyalkylene derivatives are given in Table 1.

Water Solubility and Scouring

The complete water solubility of the "Oxitex" lubricants enables materials oiled with them to be scoured with greater ease and safety than when conventional products are employed. In fact, with some yarns prepared from clean wools or man-made fibre blends, scouring, which is usually an essential step prior to dyeing, can be omitted. The "Oxitex" lubricants, far from having any adverse effects on dying, provide a slight retarding action. This prevents premature "strike" and has a generally desirable levelling effect.

Where scouring is necessary to remove residual wool grease and mill dirt, yarns and pieces may be scoured down to consistently low residuals in mild, completely neutral, detergent baths. When the goods contain a high proportion of natural wool grease the applied "Oxitex" substantially aids its removal in such baths. There will be no residual oil or lime soap left behind to plague the dyer and, of course, hard water can be used in scouring.

Further advantages of being able to scour in mild, neutral conditions are as follows:—

(1) Yarns and pieces are in a correct neutral condition for entering into the dyebath.

(2) The yellowing of wool and the attack on alkali-sensitive fibres is avoided. Stronger yarns result when fibres sensitive to prolonged wet processing are employed.

(3) If required, fabrics can be effectively carbonised in the grease prior to milling, thus preventing the uneven impregnation which often arises through inadequate scouring or the presence of lime soaps.
In the case of acid milling where scouring and rinsing techniques are laborious, processing time can be saved by eliminating scouring prior to milling.

(4) Yarns prepared from stock dyed blends are scoured without colour bleeding or loss of tone. Similarly, checks and tartans prepared from stock dyed wools exhibit a clearer face.

(5) Problems of the efficient scouring of yarn in package form are largely overcome. This will facilitate further progress in combined scouring and dyeing techniques.

A particularly desirable feature of these new processing ideas is that by additionally employing the latest techniques of neutral raw wool scouring with non-ionic detergents (such as Nonidet P42), wool and wool blends may be processed throughout without alkali. As these techniques are developed the resultant finished products will be stronger, cleaner and of more even quality, in keeping with the present day requirements of the trade.

Conclusions

From laboratory tests, performance trials in mills and current commercial application, it would appear that the "Oxitex" lubricants possess a number of important properties, which on technical grounds should enable them to become quickly accepted as suitable lubricants for the processing of wool and man-made fibre blends.

These properties may be summarised as follows:—

(1) Excellent lubrication properties, which are correctly balanced to counter all types of frictional forces met with in woollen carding spinning, imparting a desirable combination of drag and slip to the fibres.

(2) Suitable viscosity which shows little change with temperature. High flash points.

(3) Clear, bright appearance, pale in colour and completely soluble in water to give at normal temperatures, stable, essentially neutral solutions.

(4) Complete resistance to sludge formation or gumming. If left on yarns or fabrics will not develop rancidity, odour, mildew, or oxidation products which are hard to remove.

(5) Chemically stable—will not combine with lime or other contaminants to form sticky deposits enabling cards to be run longer between fettlings.

(6) No deleterious action on card clothing, metal parts, leather tapes, or condenser rubbers.

(7) Tests have shown that these products are essentially non-irritant to the skin.

Furthermore, the use of these products in full scale and continued practice has shown that:—

(1) When applied at low concentration satisfy all the requirements of a lubricant permitting normal carding with a minimum of "fly" and waste, ensuring the production of uniform yarns with higher than normal yield and a higher strength.

(2) The lubricant permits complete scouring in simple, mild neutral liquors to consistantly low residues. Where desired clean yarns may be safely passed direct to the dye bath.

Flammability Standards

(*continued from page* 438)

Nylon Blends and Mixtures

When nylon is used as one component in a fabric containing another fibre which is inflammable, it usually lowers the rate of propagation of flame, but does not prevent flame propagation. When such a fabric is ignited, the other fibre both assists the nylon to burn and supports molten nylon on the fabric. The supporting fibre is also to some extent protected, and burns more slowly (compare the cotton /nylon shirt fabric in Table 1).

We know of no satisfactory flameproof treatment currently available for fabrics which contain nylon and other fibre and in which the nylon makes an important contribution to propagation of flame.

Conclusions

We suggest that manufacturers of nylon fabrics should test them for flammability, and in Table 2 we put forward criteria by which a very high standard of flammability is assured. They are readily attainable with nylon and all fabrics which conform to them come into the class of low flammability. The criteria put forward for the first category in Table 2—it includes women's and children's nightwear and dresses—is more stringent than that specified by the B.S.I. Although some nylon fabrics could be classed as flame-proof, we consider this classification really to be intended for flame-proof industrial clothing, and that the simpler test of B.S. 2963 is fully adequate for ordinary apparel.

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1. **Lawson, D. I., "Fire Accidents—The Contribution of some Textiles." Research applied in Industry, April, 1958, XI, No. 4, 126-133.**
2. **"The Flammability of Apparel Fabrics in Relation to Domestic Burning Accidents." British Standard Institution P.D. 2777:1957.**

Table 2. Flammability Criteria for Nylon Apparel and Domestic Fabrics

Description of Fabrics	Results of Test (B.S.2963)
Fabrics for apparel, other than proofed or coated fabrics	Flame not propagated
Proofed and coated rainwear fabrics	*Either* Flame not propagated *or* Self-extinguishing *or* a Flame-resistance rating of 150 or more
All other fabrics for use in the home (e.g. upholstery fabrics, bed sheets)	*Either* Flame not propagated *or* Self-extinguishing

The fabrics should be tested both without preliminary dry cleaning or washing, and after laundering to B.S.3121, Appendix A.

Mechanical Features in the Dautricourt Circular Loom

It is planned to have twelve models of this loom in production by the end of the year, two each working on cotton, woollen, worsted, blanket, filament yarns and asbestos

By SEFTON S. SAMUELS, A.T.I.

A PREVIOUS article on this interesting machine ("T.M.," Aug., p. 327) dealt with its general aspects and it is now proposed to explain further the principles of circular weaving and the various mechanisms of the Dautricourt machine. Knowing, of course, that circular weaving is a practical possibility, what then are its general advantages in comparison with conventional flat weaving methods

(1) On a flat loom the shuttle—the basic instrument of production—is stationary for well over half the time (according to the timing of the particular loom), whereas in circular weaving the shuttle or shuttles rotate continuously.

(2) The maximum speed of weft unwinding, depending on the raw material and type of yarn, has been found to be somewhere in the region of 1,500 yds./min. which is, therefore, the limiting factor of conventional flat weaving inserting one pick at a time, and this speed is now being approached in the latest automatic machinery. In circular weaving, several shuttles can be operating simultaneously so that unwinding can take place at much lower speeds from each individual shuttle, thereby permitting increased production and more even tension due to continuous and regular laying of the weft into the cloth.

(3) Considerable reduction of friction, wear and tear, with the elimination of the "stop and start" shuttle process of picking taking place on conventional flat looms; this results in cheaper maintainance costs for replacement of shuttles, pickers, picking sticks and straps, etc., and also increased weaving efficiency.

(4) Elimination of picking faults such as curls, trailers, sloughing weft packages.

(5) No temple faults; important to manufacturers of delicate lightweight fabrics, particularly those made from man-made fibres.

(6) The absence of extra warp ends for the selvedge prevents waviness and so removes the dangers of cloth rolling during the dyeing and finishing operations.

(7) In the natural radial construction of the circular loom, the ends per in. are more spaced at the healds than at the cloth fell so that (*a*) fewer shafts are required for highly sett warp cloths and (*b*) there are fewer end breakages because of the more spaced crossing of ends.

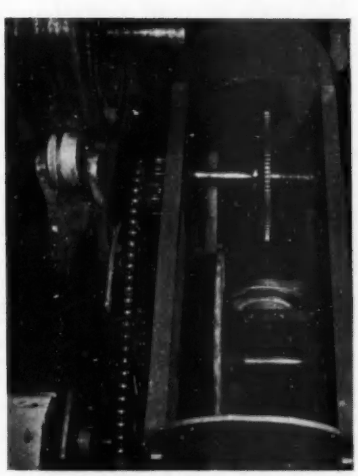
(8) Reduction of friction and prevention of reed marking by employing a circular comb device for beating-up.

(9) A reduction in noise which automatically tends to lessen the fatigue factor normally encountered in mills today.

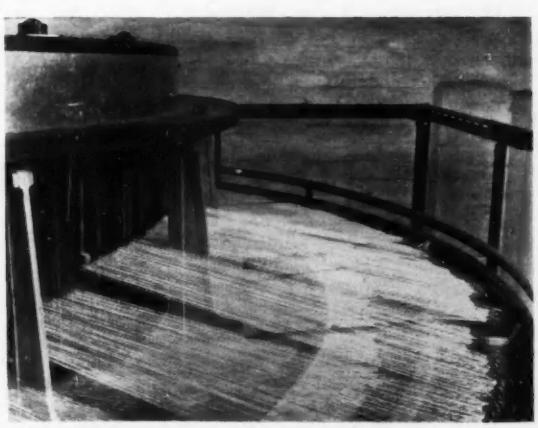
(10) Less space, greater productivity and savings in such overheads.

Principles of the Dautricourt C.W.M.

The machine, weighing 2 tons 10 cwts., is powered by a 5 h.p. motor which drives by means of a hydraulic coupling, main shaft and sprocket wheel to a large cylinder—the only basic moving part of the



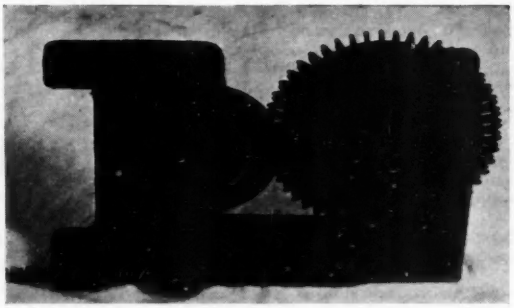
(left) Fig. 1. A view of the warp let-off motion



(right) Fig. 2. The warp threads passing from compensator springs (right) to the healds (left)

(left) Fig. 3. The shuttle drive mechanism

(right) Fig. 5. The weft cutting mechanism



machine—responsible for controlling lifting of the healds, movement of shuttles, and the beat-up. At the lower end of the same main shaft is a reduction gear to drive the take-up rollers, and the change wheel for the picks.

Warp Let-off Motion.—This motion is basically negative. As will be seen from Fig. 1, the warp beam rests at both ends unweighted on two freely revolving rollers. The warp ends are pulled from the beam by a constant diameter, variably driven roller rotated by the pressure on a tension-bar over which the warp sheet passes, thus ensuring constant tension during let-off and reducing the chance of weft bars caused by humidity changes. Larger beams are permitted and 2 - 4 beams can be installed around the loom.

Warp Thread Tension.—Each end is tensioned individually (Fig. 2) by a long steel-wire spring having a guide at the top through which the end passes. This spring, working in a type of horizontal reed, moves gently backwards and forwards to compensate for any difference in tension and, by reduction of strain during shedding and beat-up, induces fewer end breakages.

The warp-stop is also incorporated in this mechanism. As an end breaks, the tension wire is allowed to spring back until arrested by a contact bar so completing an electric circuit and stopping the loom instantaneously. A red indicator, one of 16 around the machine, lights up in the appropriate section. After passing through the compensators the ends pass direct to the healds.

Shedding.—The actual heald wires are similar to the conventional type of slider and are arranged in segments according to the sett. The lifting of these segments is positively controlled by cam followers guided along specially raised cam tracks on the surface of the revolving cylinder and the timing is so arranged that there is little movement when top and bottom sheds cross, ensuring minimum friction on the warp. The cam followers consist of fully sealed, life-time greased bearings and the heald lifting motion is all in one piece and positive in action.

Reed.—This is immobile and merely acts as a separating comb for the ends; it is not responsible for beat-up of weft. The reed is replacable according to the warp sett but this is not such a critical factor as on a flat loom.

Shuttle Drive.—One of the most difficult problems facing designers of circular looms is that of propelling a shuttle surrounded by a mass of warp threads. In the Dautricourt C.W.M. the solution has been achieved in a very effective manner. Figs. 3 and 4 show that the shuttle is driven by two specially designed gears. The first, attached to the moving cylinder, has teeth of unusual profile and, positively driven, it meshes with the warp ends which pass unharmed between the gear wheels. At the same time this gear drives a second pinion attached to the shuttle, and as this is freely rotated, the shuttle is propelled around its track.

Weft Laying and Beat-up.—An antenna borne by the shuttle carriage lays the weft trail at the rear of the shuttle close to the cloth fell, thereby minimising the yarn friction during beat-up, which is accomplished by a large revolving disc following the shuttle. This is attached to the top of the revolving cylinder and driven merely by contact with the cloth. The outer surface of this disc consists of a flat spring arranged to push home the weft into the body of the cloth. Beat-up takes place at centre shed and a special feature claimed by this method is its ability to weave cloths well above maximum theoretical sett.

Weft Stop Motion.—As the weft leaves the cop in the shuttle box it passes through a tensioning device of one or several weighted discs (depending on the tension required) and then to a weft feeler. This incorporates the weft stop mechanism which lights a small red lamp in the shuttle box and the loom is stopped almost immediately by a powerful servo brake. A reserve of roughly 3 yds. of yarn permits weft insertion to be continued until the loom stops, so avoiding missing picks.

Weaving Ring.—A short distance from the cloth fell the cloth passes over the weaving ring and then down towards the cutting mechanism. The maximum number of cloths possible are woven around this ring according to the width of the cloth, measured as the "grey" and not the "reed" width. For convenience, smaller rings can easily be interchanged, so avoiding long trails of weft between cloths.

Selvedge.—Unless an absolutely tubular cloth is desired, one or more ends at both cloth edges—working in leno weave—lock together to form a

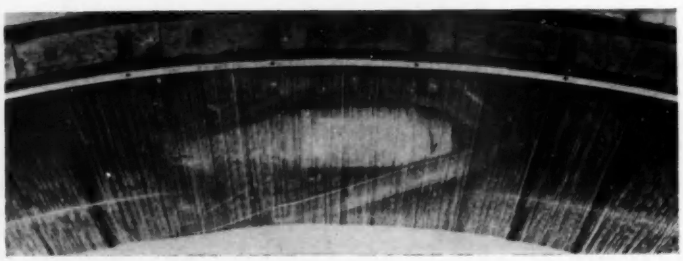


Fig. 4. A view of the shuttle passing through the warp shed

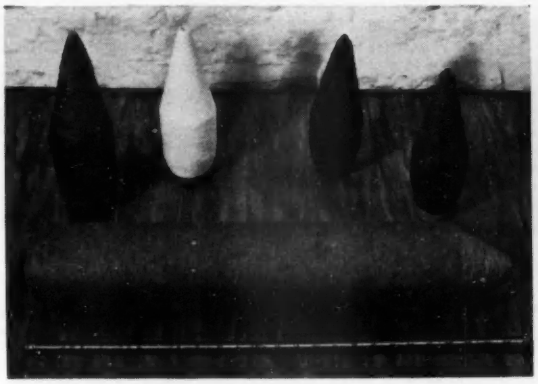


Fig. 6. Types of weft packages" (back row) (a) horse-hair/rayon staple, (b) 1/22s cotton yarn, (c) shoddy woollen, (d) 50% rayon 50% worsted. In front is a large jute super-cop

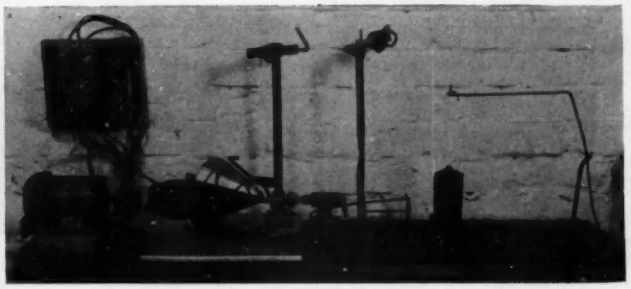


Fig. 7. The prototype winding machine

strong selvedge at any required place around the weaving ring.

Separation of Cloths.—The cloth passes from the weaving ring to the bottom of the loom where the weft between each of the cloths is cut automatically between two wheels (Fig. 5). It is then taken over a guide roller on to the take-up rollers or cuttled on to a scray.

Super-cop Packages.—The Dautricourt weft packages (Fig. 6), much larger than those found on a conventional loom, are constructed on the coreless type for even unwinding tension from beginning to end, and designed to last for a minimum of approximately 60 mins. continuous weaving.

The winding takes place on a specially designed machine (Fig. 7) and the package is of the cross-wound type having few coils from tip to shoulder so as to form an extremely firm package. The angle of the superimposed threads is as near as practicable to a right angle, forming a strong build and resulting in cleaner unwinding. Winding speeds average 3,000 r.p.m., giving the yarn a winding rate of up to 500 yds./min. Incorporated in the winder are: an adjustable tensioning device; tension compensator; yarn-break stop motion; and an end stop motion.

There are two standard models of Dautricourt loom, the 4-shuttle model having packages 22 ins. long and 5 ins. dia., holding the following weights of yarn:—

8 lbs. — asbestos
6 lbs. — jute
4½ lbs. — waste cotton or woollen

The package size for the 8-shuttle loom is 12 × 4 ins. and contains approximately 14 ozs. of yarn, suitable for medium and fine counts in cotton, man-made fibres, worsted, linen or silk. These large packages have the advantage of reducing weft replenishment mechanism and yarn waste.

Looming New Warps.—Where the warp is of the same sett as the previous one, the conventional method of "twisting-in"—whether manual or automatic—is employed. Looming new sett warps is said to take place as quickly and a spare set of healds may be prepared beforehand.

Application of the Dautricourt

The large weft capacity must be of especial interest to manufacturers of jute, asbestos, linen, blankets and coarse cotton weft cloths where normally only one or two looms per weaver is permissible due to the constant shuttle and pirn changing necessitated by very coarse yarns. The particular attention paid to warp and weft tension and gentle treatment of the yarn should enhance its prospects for the man-made fibre industry. And the weft mixing possible with the 8 shuttles should satisfy woollen and worsted producers of serges and flannels, etc. However, although an extremely diverse machine in general textile application, it must be stated that the Dautricourt C.W.M. is not intended for the fancy trade or for short runs. It is a plain loom designed for bulk production at high speed; the standard model has provision for up to 6-shaft weaves.

Theoretical Production Estimation

The shuttles are revolving at 40 r.p.m., thus inserting (on the 8-shuttle model) 320 p.p.m. into each of the cloths woven around the full 200 ins. circum.—or over a mile of weft per minute with 100% efficiency! On either basis of picks or yards of weft per minute, one can now work out comparisons with conventional machinery, using one's own particular specifications (see Table 1).

When one also considers that one weaver is estimated to follow from 4 - 6 machines, then this new weaving machine, if successful, must surely have great possibilities? The prototype, now running in a mill near Hebden Bridge, has aroused considerable interest and enquiries have been received from many parts of the world. Meanwhile, plans are in progress for the production of twelve development models by the year end, two each in the six sections of the trade.

TABLE 1

(1) **Plain Cotton Cloth** (on 8-shuttle circular model)
5 cloths of 40-in. width woven together on 1 circular machine;
1 cloth of 40-in. width woven on 1 flat loom, at say 175 p.p.m.;

$$\text{Production from 1 Dautricourt machine} = \frac{320 \times 5}{175 \times 1} = 9{\cdot}1 \text{ conventional looms.}$$

(2) **Worsted Warp/Cotton Weft Gabardine** (on 8-shuttle model)
3 cloths of 65-in. width on 1 circular machine;
1 cloth of 65-in. width on 1 flat loom at 140 p.p.m.;

$$\text{Production from 1 C.W.M.} = \frac{320 \times 3}{140 \times 1} = 6{\cdot}8 \text{ conventional looms.}$$

(3) **Asbestos Cloth** (on 4-shuttle model)
5 cloths of 40-in. width on 1 circular machine (160 p.p.m.);
1 cloth of 40-in. width on 1 flat loom at 80 p.p.m.;

$$= \frac{160 \times 5}{80 \times 1} = 10 \text{ conventional looms.}$$

TEXTILE MACHINERY and MILL EQUIPMENT NEWS

Kusters-Hunt Aquaroll Water Mangle

Accessories available with this mangle include feed-in arrangements, batching equipment, plaiter equipment and compensators

HOLDERS of the manufacturing rights in Great Britian, Eire, Canada, Australia, Columbia, Ecuador and Bolivia of the Kusters-Hunt Aquaroll water mangle, Hunt and Moscrop Ltd., Middleton, report considerable success with the machine. In addition to the installations in British firms it is also in use in seventeen overseas countries. Claiming that it gives the highest squeezing effect and completely eliminates camber, the manufactures point out that it provides other advantages including absolute eveness of squeeze over the entire width of material, automatic compensation for any deflection of the counter bowl, also mild treatment of fabric due to using a Perlon squeeze roller.

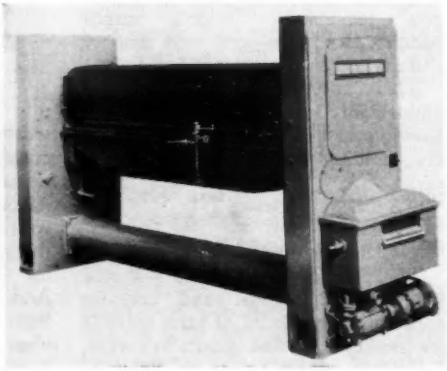
The high efficiency of this machine allows certain subsequent operations, such as starching and resin finishing, to be carried out on moist fabrics without diluting the liquor, thus eliminating intermediate drying and consequently saving considerable steam. Basically, the unit consists of two accurately machined cast iron side frames, an ebonite covered top bowl, a pressure chamber consisting of a non-corrosive aluminium casting with a Perlon squeezing roller and a container providing a water reservoir for the pressure system. The Perlon bowl—which has no bearings—is sealed on all sides and floats on a cushion of water formed within the aluminium pressure chamber. When the machine is started, water pressure applied to the projected area of the bowl surface forces it against the ebonite counter-bowl so that even pressure distribution between bowl faces is achieved at all pressures, no camber being required. The expressions obtained are stated to be far in advance of those of any known mangle, also that the squeeze is absolutely uniform across the full width of the nip.

The two-chamber design is arranged with an air cushion within the pressure chamber—a technique allowing a certain degree of elasticity within the system. Pressure is provided by a rotary pump drawing its water supply from the reservoir. The water level in the reservoir is automatically maintained by a floating valve and as there is no pressure within the reservoir, the pressure chamber is completely isolated from any fluctuations that may occur within the main water supply serving the machine.

Pressure—controlled from zero to maximum by an adjusting valve—is applied or released by switching the pump motor on or off and to avoid excessive pressure within the system the pressure chamber is fitted with a safety valve. A filter is provided between pump and water reservoir and to facilitate removal of this filter for cleaning purposes, both pump and filter are attached to the machine frame so as to be easily accessible.

The pressure chamber, with the squeezing roller, is on special mountings beneath the top bowl. This permits the chamber to be swung through 90° should it be necessary to remove the squeeze roller from the pressure chamber, the bowl being extracted in minutes by pressurising the chamber. A special sealing arrangement fitted to the pressure chamber consists of a brass frame securely attached to the casting to provide location for both side and end seals. The side seals are self-compensating to meet any change in the diameter of the Perlon roller due to regrinding and are covered with doctor blades as a protection against the intrusion of fluff and other foreign matter. End seals are quickly interchangeable should the roller diameter fall below a pre-determined level.

Controls attached to the frame side include a switch-box for the pump motor, a handwheel for operating the pressure regulating valve and a pressure gauge. The drive mechanism to

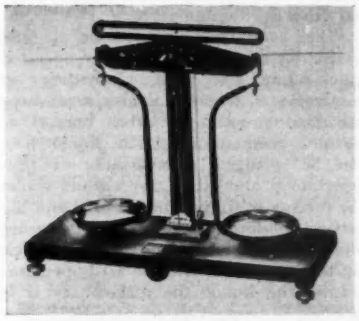


The standard Aquaroll machine is designed for working widths of 36 to 126 in., although machines for larger widths can be provided. Pressure capacity is 57 lb./sq. in. The standard machine is also supplied with guiding rollers, expander and rinsing tank

the top bowl is totally enclosed within the frames and is achieved through chains lubricated by an oildrop system attached to the frame side. Drive to the machine can be applied, according to requirements, from either a flange type motor mounted directly on the frame or by indirect mechanisms.

The standard machine is supplied with cloth guide rollers, an expander and a rinsing tank situated in front of the nip. Accessories available include feed-in arrangements, batching equipment, plaiter equipment and compensators. The standard machine is designed for working widths of 36 to 126 ins. although machines for larger widths can be provided. The pressure capacity is 57 lbs./sq. in.—approximately 270 lbs. per linear inch at the nip.

New Precision Balance



THE new "Duorider" balance recently announced by Griffin and George Ltd., Ealing Road, Alperton, Middlesex, is an important step forward in the design of general purpose balances with analytical features. Special techniques of manufacture have been developed which link certain analytical balance characteristics with those of the conventional type of student's balance. The result is a reliable, accurate instrument that "looks good."

The agate bearings are all relieved when the beam is lowered. The arrestment is provided with integrally pressed Y-arms to support the single piece, pressed metal stirrups clear of the end knives when the beam is held at rest. The agate knives are retained by the new method of positioning screws.

When not in use the balance beam is supported in the two central slots of the arrestment and maintained level by two locked screws. The slots also protect the beam against accidental displacement, while the repositioning of the poising nuts near the central agate further reduces damage risk. The metal rider-bar, chemically etched and individually anodised black, with white-filled graduations carries two captive riders of 1·0 gramme and 0·1 gramme respectively. They move over 9 notched divisions from left-hand zero to centre and over 50 divisions from centre zero to the right.

The arrestment is held on two pillars attached to a rectangular plate locked to the base by two knurled nuts, which tighten in recesses in the lower surface. The central bearing plane and the pointer scale are mounted on a plated rod, which moves between the two pillars with a rectangular cam-plate at its lower end into which a crank-pin fits directly thus eliminating a connecting link. The curved, inclined scale, by rising and falling with the beam enables the swing of the pointer, which has an oblique tip and an easily adjustable sensitivity-weight, to be more accurately observed.

The type of bow ensures easy loading and reduces possible damage to the balance. The four-inch stainless-steel pans are resistant to corrosion.

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New Enterprise for Northern Ireland

It is reported that Clutsom and Kemp Ltd., Coalville, Leicester, are to start an enterprise in Northern Ireland. As a result of a pooling of technical knowledge with the Darlington Fabrics Corporation, New York, the English company will carry out covering of rubber thread in a factory now being built by the Northern Ireland Ministry of Commerce at Carnmoney, near Belfast. Production is expected to start early next year.

Multi-Packaging Aid

LATEST addition to the range of film-wrapping and heat-sealing devices made by British Cellophane Ltd., Henrietta House, 9 Henrietta Place, London, W.1, is a multi-packaging aid, designed to facilitate manual multi-packaging (or "parcelling") of cartons and other regular-shaped containers in "Cellophane" film, the aid is especially suited to the needs of manufacturers and packers whose circumstances do not warrant the installation of automatic multi-packaging machinery. It consists, basically, of a 22½ × 18 in. metal platform, on which is mounted a pair of brackets supporting a pivoted sealing-bar assembly. The sealer—at the far end of the platform, as the operator faces it—is raised well above the platform when not in use, allowing completely free movement there. It is 16 in. long and has two independent sealing faces.

The sealer is activated by moving the assembled multi-pack forward on the platform, to make contact with a pressure plate. This acts against a pressure bar on the assembly and swings the sealer down to make a longitudinal seal on top of the multi-pack. The pressure plate also helps to ensure correct alignment of the components of the pack. The ends of the pack are sealed by brushing the end-folds against the second sealing face of the bar (which faces the operator) with the assembly raised. This involves lifting the multi-pack, and can only be done where the pack is relatively small and light. Larger, heavier packs are sealed by a separate end-sealer (supplied as an accessory). Both sealers are adjustable by wing-nuts, and the aid will accommodate packs up to 15 in. long, and between 4 and 9 in. wide and 3 and 7 in. high (multi-packs less than 3 in. high can also be wrapped if they are placed on a suitable mounting block during the longitudinal sealing operation). Sealing temperature is regulated by a thermostat, conveniently housed underneath the platform.

The sealer — 16 in. long — has two independent sealing faces

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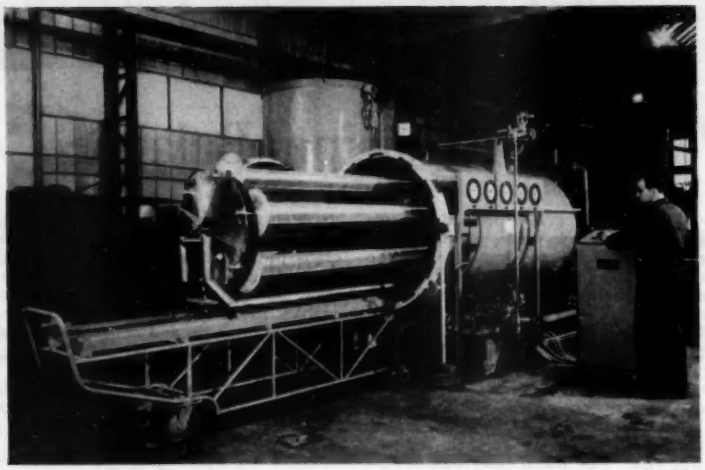
Technical Information

The following publications are now available I.C.I. Ltd., Dyestuffs Division, Blackley, Manchester.

No. 576. Dyeing Polyester/Cellulosic Unions: Continuous Methods

No. 580. The Procion-Resist Process (Questions and Answers)

Compact High Temperature Dyeing, etc., Machine



Versatile in application and designed to ensure uniform dyeing, etc., treatments the "Colourfix" machine made by Eugen Bellman GmbH., Hagen-Haspe, Germany, will handle knitted or woven fabrics, spinning cakes, yarn packages, hanks or slivers of cotton, wool or other fibres. High temperature dyeing can be carried out up to 275°F. and the machine can also be used to fix or set synthetic yarns or fabrics. Perforated carriers are employed for treating piece goods or warp beams, etc., the entire build-up-being held on a trolley which facilitates loading into the high-pressure tank through a dog-clutch operated drive.

When everything is in position the tank is securely closed by a manually operated quick-acting lock and, depending on requirements, scouring, dyeing or washing can then proceed at either normal or elevated temperatures. The liquor flow can be changed automatically at predetermined intervals if desired and whilst the process continues the material and the carriers holding it both revolve to ensure uniform treatment throughout. With high lap thickness and materials easily penetrated by the liquor the makers say it is possible to work with a single beam that rotates by itself. A sampling container connected in parallel with the main liquor flow enables sampling to be easily carried out. Adequate precision instrumentation provides complete control of both pressure and temperature. The machine is supplied in three sizes for working widths of 48, 64 and 88 ins.

Lifting and Tipping Machine

THE increasing rate of mechanisation of industrial processes is constantly giving rise to the need for more rapid handling of materials and the manufacturers of mechanical handling equipment are keeping pace with modern developments by eliminating the need for the manhandling of all types of substances. Many kinds of appliances in a more or less elaborate form are available for transporting, lifting, stacking and in fact for performing any kind of handling operation swiftly and economically.

In order to fulfil the need for a simple and reliable machine for lifting and emptying all types of containers, Russell Constructions Ltd., have developed a unit which will lift any kind of container weighing up to 10 cwt. and will tip it so as to empty the contents into a hopper. truck, mixer or other receptacle. This machine, known as the "Hi-Tip" has a minimum height of lift of 4 ft. 6 in. An interesting feature is the fact that vertical sections can be added to increase this dimension to any height desired.

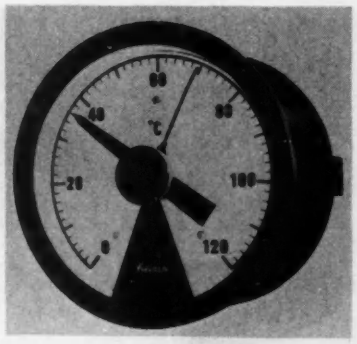
The "Hi-Tip" has been developed to lift any kind of container weighing up to 10 cwt. and tip it to empty the contents into hopper, mixer, etc. Automatic stop devices are fitted at loading and tipping positions

It is fabricated of ¼ in. mild steel of all-welded construction and consists of a base, a top unit and centre sections. The base, which for the standard machine occupies an area of only 3 ft. × 4 ft. 6 in., houses the electrical equipment, control mechanism, main drive and chain compensating device, all the mechanical parts beingade quately protected.

The top unit contains the actuating cam guides for the tipping action and the centre sections, which can be added or removed to alter the height of lift, include the appropriate lengths of guide rails. The machine is powered by an electric motor with a self-contained braking unit and the carriage is elevated by means of twin Renold lifting chains and sprockets. Automatic stop devices are fitted at loading and tipping positions and an overload switch is used to protect the motor.

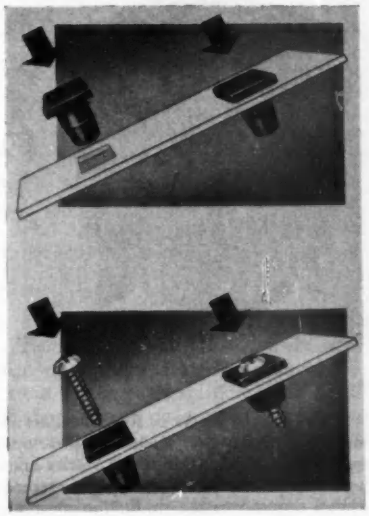
The start and return operations are actuated manually but automatic sequence control can be provided if required, the emptying time being controlled by a variable time switch. The speed of lift is 30 ft./min. and the standard tipping angle is 30° from the vertical. The cradle can be adapted to take any particular type of containers such as drums, barrels, kegs, skips, trolleys, vats, bowls, sacks, etc., the chute being shaped to suit the material being handled. The Russell "Hi-Tip" is suitable for continuous 24 hour operation. It requires virtually no maintenance and is foolproof in use. It can be provided in a portable form if required and is finished to any specified colour. Further details may be obtained from the manufacturers at Russell House, Adam Street, London. W.C.2.

Temperature Indicator-Controller



A NEW electronic temperature indicator-controller is now available from Fielden Electronics Ltd., Wythenshawe, Manchester. Like the Bikini indicator it is housed in a 6 in. dia. panel-mounting case and has a 13 in. scale calibrated in °C. or °F. (in any of 73 standard ranges for temperatures between — 200°C. and + 850°C. (— 330° to 1,550°F.). The control point is set by a pointer operated from the knob in the centre of the dial, whilst the indicating pointer is motor-driven from a servo-system. Completely transistorised it can be operated from 12 volts d.c. or the usual mains supply. The platinum resistance measuring bulb is housed in a robust stainless steel sheath of ¼ in. dia. and can be located at any distance up to 300 ft. away from the instrument. The control relay, which has contacts rated at 10 amperes to provide both changeover and "normally open" switching can be located up to 300 ft. or more distant from the instrument if required.

All interconnections are made with simple electric cabling having no effect on the performance or calibration of the Indicator-Controller which, being electronic provides an instantaneous response between measuring point and instrument, and instrument and control relay. The makers claim a calibration accuracy of ± 0·5% of the scale and a repeatability of 0·25°C. on most ranges. Large-scale production has already commenced and many of the 73 ranges are available with prompt delivery.



Tough Shake-Proof Fastener

OF considerable interest to all trades, the new Insulgrip fastner made by George Goodman Ltd., Robin Hood Lane, Birmingham 28. is injection moulded in Type 66 nylon. This offers a new, tough, shakeproof and virtually indestructible form of anchorage that is of particular value where fastening access is limited to one side of the assembly. Two types are currently available. Type 1 utilises an underhead square engaging in a preformed square hole to prevent rotation during the thread-forming and collapsing phase; for general applications in all industries. Type 2 relies on two preformed round holes for anti-rotational and anchorage purposes, and is designed particularly for use in the electrical industry where large insulation surfaces are required or where it is impracticable to form a square hole.

The Insulgrip principle is simple to employ and needs no special assembly tools. Inserted into suitably formed hole, the specially designed projections clip the fastener in position and lead the product correctly into the hole. This minimises a common assembly hazard. Next, N.P.K. self-tapping screw is screwed in and the Insulgrip will collapse to form a firm fixing. The screw can be replaced any number of times, the assembly remaining fast.

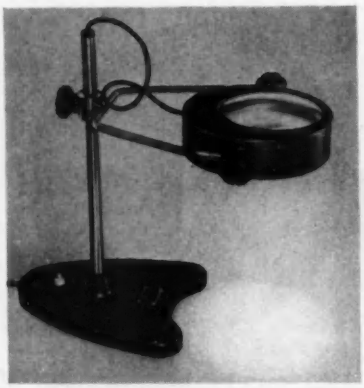
Ultra-Violet Bench Light

The A.409 bench type ultra-violet light

Designed around the new miniature 9 ins. ultra-violet fluorescent tubes is a recently marketed bench light, the "Allen" A. 409. This high efficiency ultra violet light for use on desk or bench has many applications for engineering inspection, printers, dyers and textile manufacturers, etc. The light source is two 9 ins. miniature fluorescent tubes giving radiation in the 3650 A.U. There is no radiation below 3100 A.U. and almost no visible light. Always ready for use without delay for warming up the A. 409 is very efficient with high U.V. output for a consumption of only 20 watts. The tubes run quite cool and are stated to have an average life of 5,000 hours.

The lamp housing is fully adjustable including vertical positioning and the whole unit is stable in any position on the heavy 7 ins. dia. base. A separate electro brightened aluminium reflector is fitted to ensure maximum radiation and a 4 mm. "Woods" glass screen to filter out radiation in the visible waveband. The light is finished in silver grey hammertone enamel with the stayput tube in polished chrome. Supplied complete with tubes and connecting cable the A. 409 is for use on 200 - 250 volt mains only.

Bench Illuminator Magnifier



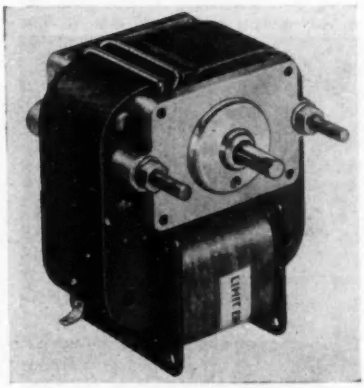
PLUGGED into the nearest electric light socket, the "Ellisviewer" is immediately ready for use. The "hood" in which is housed the two light bulbs, has an optically worked glass lens 5 ins. dia. and a magnification of 2½ times and, as will be seen in the illustration, it is not only adjustable on the main stand, for height and correct focus, but may also be tilted to any angle, thus affording perfect vision angle and steady illumination of the spot to be examined.

Although this magnifier can be used for the examination of isolated articles it is particularly suited to repetitive examination. A press-button switch is provided on the baseplate and an ample length of well insulated, plastic covered cable is also supplied with each unit, the only addition required being a suitable plug. The main column and hood yoke are chromium plated and the base and hood are in a pleasing grey polychromatic finish, the large adjusting knobs being in black plastic.

It will be found useful in almost every section of industry, in technical colleges, universities and laboratories of all kinds, in packaging, printing and allied trades, and in yarn and cloth examinations.

Further details may be obtained from Ellis Optical Co., Mayday Road, Thornton Heath, Surrey.

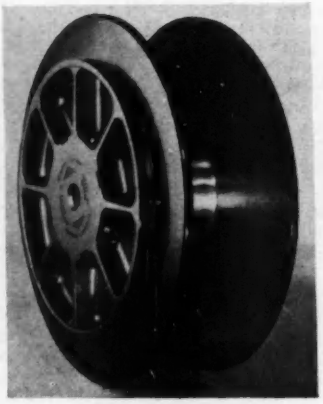
New Range of Motors



LIMIT Engineering Group Ltd., 64 Essex Road, Islington, London, N.1., announce the introduction of an entirely new range of shaded pole skeleton frame motors, designated the "P" range. Twelve different models are available for both 50 cycle and 60 cycle supplies up to 250 volts, covering outputs from 1·24 oz. ins. to 7·2 oz. ins. continuous or intermittent ratings. To assist in choosing the correct type, a selection curve is available giving intermittent rating times.

Dimensions have been standardised as much as possible throughout the range, only four different core lengths being employed, and two sizes of shaft diameters are available as standard. Gearboxes are also available as a standard fitment where required. "P" type motors can be applied to fan heaters, projectors, vending and office machines, domestic equipment and similar apparatus.

Large Flange Selvedge Bobbins



THE range of selvedge bobbins manufactured by Stabel Products Ltd., Burnsall Road, Canley, Coventry, now include types with 11 and 12 ins. dia. flanges, the previous largest size being 9½ ins. They have been designed to be sufficiently strong to withstand the outward pressure of nylon and similar synthetic fibres now being used on an increasingly large scale in the industry, and with an extended barrel they would be suitable for knitting warps.

The photograph shows one of these new bobbins. The diameter of the barrel is 3½ ins., but the traverse width and spindle hole could be made to suit individual requirements. The flanges are moulded from shockproof Bakelite, and the barrel is polished light alloy.

NEW DEVELOPMENTS IN RUBBER. Part of the work of Rubber Technical Developments Ltd., Market Buildings, Mark Lane, London, E.C.3, described in its recent annual report was the evaluation of some of the new products recently developed in Malaya. These included SP sheet, SP brown crepe and the more recently introduced PA 80—a concentrated form of SP rubber which is said to confer superior processing properties on all grades of natural rubber by blending in the correct proportions. Further work on rubber bonded non-woven fabrics resulted in the development of processing techniques using heat sensitive latex compounds to prepare a variety of different weights of fabric which do not exhibit the tendency to delaminate. Heat sensitive latex compounds have also been used to prepare "consolidated heavy weight fabrics of high rubber content and extreme flexibility, which may have wide uses in the shoe and allied trades." The programme for the year also included the development of a new technique for obtaining fluid rubber compounds with better physical properties by means of depolymerisation in the presence of certain reinforcing fillers; and a study of the fluid bed technique for vulcanising rubber.

THE TEXTILE
COLOURIST & FINISHER

The Crease-Resisting Process: Additives

No simple rules can be laid down on the best additive to apply so that it is wise to profit by the experience of those with expert knowledge of these matters, and for the finisher to operate under the guidance and security of some acknowledged assurance of satisfaction

By J. T. MARSH

ALTHOUGH the conventional crease-resisting process is fundamentally quite straightforward, consisting of impregnation, drying, heating and washing, yet the best results require a considerable amount of care and a high degree of finishing skill.

The aqueous impregnating solution generally contains three principal ingredients as follows:—

(1) The amino-aldehyde condensation product.
(2) The catalyst.
(3) An auxiliary product or additive.

The mechanism, whatever it may be, that produces recovery from creasing also reduces the extensibility to some extent and imparts an increase in rigidity. It is the purpose of the additive or auxiliary to obviate or suppress these concomitant disadvantages in the product. The additives fall into the following three types—(*a*) softeners, (*b*) emulsion polymers, and (*c*) silicones. None of these products penetrate the fibre nor do they actually plasticise the amino-aldehyde condensation product itself.

Softeners

Although softeners have been used in textile finishes for very many years, their action has never been precisely defined. It is not surprising that attempts should have been made to "soften" fabrics which had been deprived of their natural oil, fat or wax during purification processes, or had their handle adversely affected by old-fashioned filling agents such as starch and china-clay; further, certain colouring matters gave a slightly unpleasant "dry" feel to the goods and this had to be corrected before they could be considered as satisfactory.

One of the earliest softeners was tallow but it was never used alone; in conjunction with china clay it prevented "dusting" and corrected the harsh feel of the cotton fabric. Soaps, sulphonated oils, and sulphonated tallow were used later, and there is still quite extensive application of these products.

It is now known that the common softeners are oily or waxy materials which coat the surface of the fibres and actually lubricate them so that they may slide easily on one another and produce a soft and supple fabric; there is no penetration of the fibre and the action is not one of plasticising. They tend to eliminate the surface roughness of the cotton hair, particularly if a calendering treatment is also given, and to suppress the stiffness of rayon which is often over-dried and sometimes stretched during scouring and finishing.

The fatty acids in tallow, and also in many soaps, have chains of 15 to 18 carbon atoms, and the vast majority of modern softeners also contain a fatty chain of similar length; branched-chain compounds are relatively ineffective as softeners, and in general, the softening efficiency of the straight-chain hydrocarbon improves up to 18 carbon atoms, so that stearic acid ($C_{17}H_{35}COOH$) is one of the commoner raw materials.

Because of the necessity of obtaining soluble products, various chemical devices have been applied, and modern softeners may be classified according to the nature of the solubilising group.

Types of Softener

$\underline{R}-O.SO_3.Na$	ANIONIC
$\underline{R}-CO.NH.CH_2.CH_2.N(CH_3)_2.HCl$	CATIONIC
$\underline{R}-O.(CH_2.CH_2.O)_n.H$	NON-IONIC

In certain examples, the solubilising group may also exert an effect on the softening power of the compound, but their most important secondary action is to influence the substantivity of the softener. The cationic products have some affinity for both animal and vegetable fibres, and tend to "exhaust," thus providing some degree of resistance to washing; the anionic compounds are only substantive on wool, but, as might be expected, the non-ionic products have little or no substantivity. Unlike the latices of some of the emulsion polymers, these conventional softening agents do not impart any sensation of fullness, but rather

produce a smooth effect which may be quite pronounced with many of the cationic products.

From the standpoint of the organic chemist, it may be of interest to give some of the commoner types of compound which have been used in the various classes of softening agents.

Anion Active— Sulphonated paraffin, sulphated oils, sulphated fats, and acylsarcosinates.

Cation Active— Fatty amine salts, amino-ester salts, iminazoline salts, diguanide salts, quaternary ammonium salts, and quaternary ammonium salts of amino-amides.

Non-ionic— Alkyl polyoxethylene ethers, polyoxyethylene fatty amines, polyoxyethylene fatty esters, and polyoxyethylene fatty amides.

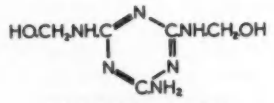
There are some advantages in the hydroxyalkylated amides of the higher fatty acids, for they are amphoteric, becoming cationic with acids and anionic with alkali; many of the well-known Sapamines belong to this class of compound. More recently, there has been increasing use of the non-ionic compounds, based on polyethylene oxide, as these have good lubricating powers.

Quaternary ammonium compounds, too, have been popular as softeners and some of these are capable of chemical combination with the fibre; many of them are efficient in the field of water-repellency when used in rather greater quantities than required for softening only. Velan PF is the most outstanding example of this class; it is stearamido methyl pyridinium chloride. Other

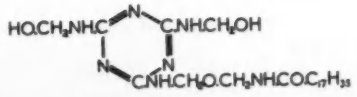
$$C_{17}H_{35}.CO.NH.CH_2.N.(C_5H_5)\,Cl$$

compounds which may possibly combine with the fibre are the methylol stearamides and similar products sold under various trade names.

Compounds have also been synthesised as part of the amino-aldehyde reagent used for crease-proofing or, alternatively, they may be applied separately as permanent water-repelling agents. A typical example is derived from melamine and may be the basis of products such as Permel or Phobotex.



Dimethylol melamine



Water-repellant derivative of dimethylol melamine

At the time when the crease-resisting process was launched in 1932, it was realised that the presence of the resin gave a slightly firm handle which might have to be corrected, and an examination by the writer of the old-fashioned softeners then available showed that fatty compounds with about 17 carbon atoms in the chain gave a pleasant handle; indeed, the conventional stearin-borax softener had much to commend it, and was used for many years. Some of this product was lost during the heating process to condense the resin, but it was also usual at this period to add a little softener to the final rinsing water after washing the treated goods. There is much to commend the practice of a final softening of the goods, but unfortunately, all too many finishers no longer include the washing stage as part of the crease-resist finish.

Ever since the crease-resisting process was first launched finishers have been advised to use softeners as a corrective; their surface effect not only improved the handle of the goods but also obviated some of the apparent fall in resistance to abrasion, most of which could be attributed to the method of testing.

In post-war days, there was a slackening demand for crease-resisting rayon and an improved demand for treated cottons; hence ripping strength became of greater consequence. At least one chemist considered that tensile strength had always been a much overworked criterion of textile quality, except for certain minima, and that ripping strength or tearing strength was a more satisfactory index of serviceability, if only on the grounds of common experience as a source of failure. Furthermore, the ripping strength is more dependent on extensibility. When a cloth is torn, the threads tend to be broken in small groups, or even singly, according to the construction of the fabric and the type of finish; if however, the yarns and fibres can slip on one another and permit local distortion of the weave in the region of the stress, then deformation of the structure causes some agglomeration of the yarns and a sharing of the load. Hence it became clear that the so-called softeners could also act as lubricants, and indeed, this may possibly be their most important function as additives in the crease-resisting finish.

Investigations of the lubricating action of many products was carried out by Marsh and Thompson in 1948-9 when it was found that several of the polyoxyethylene compounds possessed particular advantages. With untreated fabrics, there may be a tendency for an excessive degree of lubrication to reduce inter-fibre friction to such an extent that the tensile strength may be adversely affected in the case of open weaves and soft-spun yarns, but this does not apply with the vast majority of crease-resisting fabrics. Lubrication helps to minimise the external friction which

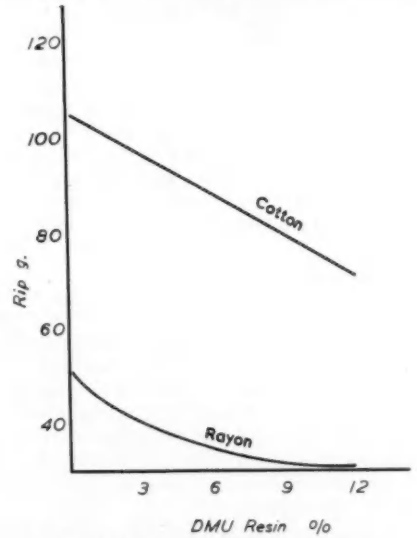


Fig. 1. Effect of crease-resisting process on ripping strength

has to be overcome during the act of recovery from creasing, and it also makes the fabric more supple and lively. Many of these effects do not appear in the laboratory tests of crease-recovery, but are quite apparent in the hands of a skilled and experienced observer using the "clenched fist"

test. The apparent resistance to abrasion is improved and there is a definite benefit in tearing strength as the fibres and yarns rearrange themselves under load with mutual reinforcement at the dangerous point of tear. Another important advantage noted at this time was the substantial reduction in stitching damage encountered with machines operating at very high speeds. Since about 1950, the question of appropriate softeners has been discussed more frequently in the textile literature, particularly in the U.S.A.

The tear strength of resin-treated textiles has been reviewed by Truslow (Am. Dyes. Rep., 1954, **43**, 41) as a very sensitive index of changes in the fabric, particularly in the weakest direction, i.e. the weft. Examination of a number of testing methods suggested many merits in the impact tear test, but the Elmendorf method is also considered to be suitable.

All the test confirmed that cotton goods lose tear strength as the resin content is increased, and so do rayon fabrics but to a less extent; for example, at 8% resin content, a cotton cloth may lose 30% of the original ripping strength, whereas a rayon fabric may only lose 10% of the original strength.

In a series of experiments with urea-formaldehyde resins with about 1% of a cationic softener in the impregnating bath, there was a considerable improvement in ripping strength due to the presence of the softener; for example, whereas 8% of resin might lower the weft ripping strength of cotton to 47% of the original value, the presence of a softener only caused a fall to 64% of the original figure. With rayon goods, the ripping strength may even be raised to a figure which is higher than that of the untreated fabric; the softener used in these experiments was the cation-active alkylimidazoline hydroacetate (Onyxsan S). A useful bibliography forms part of the above paper by Truslow.

Although it is customary to include a softener in the impregnating bath for the crease-resisting treatment, it is sometimes necessary to correct undesirable harshness after resinification by a further softening treatment; this aspect of processing has been discussed by Murray (Am. Dyes. Rep., 1955, **44**, 141). In order to avoid an altogether impracticable series of experiments, the study was limited to a representative softener from each of the four classes, i.e. non-ionic, anionic, cationic, and a quaternary ammonium complex such as Velan or Zelan. A conventional urea-formaldehyde condensation product was applied to a spun-rayon gabardine fabric which was later treated with appropriate concentrations of the softeners to give 0·5, 1, 2 and 4% on the fabric.

All the softeners improved the ripping strength of the fabric before laundering, but the anionic softener was different from the others in that it showed no maximum over the range examined; after laundering it appeared that the ripping strength was practically independent of the concentration of the softener. In general, the anionic softener gave smaller increases than the other softeners. The non-ionic, cationic, and pyridinium salt type of softener all showed increases in ripping strength up to about 3% of softeners and there was a slight further increase on laundering. Stitching damage was generally reduced, particularly by cationic softeners and pyridinium salts, but there seemed to be little effect on tensile strength or crease-recovery.

Ripping strength is determined to a very large extent by yarn and fabric structure, so that the effect of the crease-resisting process is influenced by these factors and can only be determined in a rather broad manner. The following data have been taken from some work by Steele (Am. Dyes. Rep., 1957, **46**, 329) and should only be regarded as illustrative of the effect of a long-chain quaternary ammonium salt.

Types of Softener Elmendorf Tear Strength	
Rayon, untreated	106 g.
" untreated and softened	115 "
" 12% D.M.U.	71 "
" 12% D.M.U. and softener	89 "
Cotton, untreated	50 "
" untreated and softened	67 "
" 6% D.M.U.	30 "
" 6% D.M.U. and softener	48 "

Apart from the questions of the stability of the impregnating bath, it is not easy to see any particular reasons for preference, other than individual opinions; cationic softening agents are in widespread use, both in Europe and in the U.S.A., but there seems to be a greater tendency towards the application of non-ionic softeners in Europe than in the U.S.A.

A most valuable review of the literature of tearing strength in general, compiled by Harrison (J.T.I., 1960, **51**, 91T), also contains much useful information about the effect of resin treatment.

Emulsion Polymers

Emulsions of thermoplastic polymers are commonly applied as finishing agents in the textile industry and most, but not all, of these preparations are made by emulsion polymerisation of the monomer. Many dispersions may be given a positive or negative charge according to the type of dispersing agent. Two well-known products are polyvinyl chloride and polyvinyl acetate and, although they give some improvement in resistance to abrasion, their hardness is such that they can hardly be regarded as either softeners or lubricants.

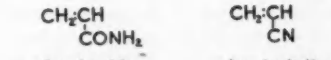
Vinyl chloride — Vinyl acetate

Accordingly, they are rarely used as additives in the crease-resisting finish; however, in conjunction with the polyacrylamides they are sometimes to be found in various trade products recommended for modifying the crease-resist product.

Many of these emulsion polymers resemble the latices of natural rubber or of the synthetic products; the use of latent acid catalysts enabled these to be used in a stable impregnating solution as described by Wood and Tankard in B.P. 486,926. One popular synthetic rubber latex considered for use with crease-resisting textiles was based on butadiene (CH_2: CH.CH: CH_2) in copolymerised form with certain acrylic compounds.

Acrylic compounds have been known for many years and many of them have been suggested for application to textiles as finishing agents in the form of emulsion polymers, even prior to 1939; there has been renewed interest since about 1950. Typical monomers include acrylic acid, ethyl acrylate, acrylamide, and acrylonitrile.

Acrylic acid — Ethyl acrylate



Acrylamide — Acrylonitrile

From the view of imparting softness, the polymers from the esters of acrylic acid are soft and the higher esters are

softer than the lower members of the series; ethyl acrylate was a popular choice at one time. Stiffer polymers may be made by co-polymerisation with the methylacrylate esters, such as methyl or ethyl methacrylate.

In general, the acrylic compounds are linear polymers but some of them may be cross-linked; for example, where there are carboxyl groups ionic linkages may be formed with some polyvalent metal salts, or where there are functional groups as in acrylamide, these may form covalent linkages with formaldehyde. Some of these mixed products can be used to reduce the solubility and swelling of the linear polymer but the thermoplasticity will be reduced; in comparison with butadiene-acrylonitrile, there is no yellowing on exposure to light.

Application of various emulsion polymers to textile materials with a view to improving the resistance to abrasion was examined in pre-war days by Battye, Corteen, Foulds and Potter as described in B.P. 527,762. There were several preparations on the market at this time, such as the Plextols, Rhoplexes, Igeplasts and some Bedafins; investigation and analysis of many of these trade products by Marsh and Holme showed that ethylacrylate was one of the best. However, there was a limit to the usefulness of these emulsion polymers, because the treated fabric was apt to pick up dust and dirt rather easily and to retain it during laundering processes; the tacky effect produced on hot-ironing was a further objection. Some of the thermoplastic effect could be suppressed by providing a sufficient number of bridges or cross-linkages during the emulsion polymerisation, according to B.P. 557,067 of Battye, Lawton, Marsh and Wood. Much of this work has been described by Marsh (Textile Finishing; Chapman and Hall; London; 1947).

The application of many of these emulsion polymers has become of renewed interest since about 1950, but not always with a view to producing a soft effect. For example, as amino-aldehydes like dimethylol ethylene urea give a somewhat limp effect on cotton compared with dimethylol urea or the corresponding melamine derivative, a slight "firmness" may be imparted to the cloth by adding polyvinyl alcohol to the impregnating solution as described in B.P. 742,885; the resistance to washing of the final product is also improved.

From the standpoint of organic chemistry, one of the simplest polymers is that derived from ethylene (CH_2:CH_2) but polyethylene is not the easiest compound to prepare, and until about 1954 high-pressure processes were necessary; the work of Ziegler, however, enabled low-pressure processes to be utilised giving a stiffer product of higher density, and a melting point of 120°C. The effect of polyethylene emulsions on the properties of crease-resisting textiles has been described by Rosenbaum (Am. Dyes. Rep., 1959, **48**, No. 10, 46).

Dispersions of suitable thermoplastic polymers are capable of giving significant improvements to the resistance to abrasion of crease-resisting fabrics as might be expected; they also improve the tensile strength and the ripping strength, but the reasons for this are not clear. Furthermore, there is a definite improvement in crease-recovery which may be associated with the rubber-like properties of the polymers; the external coating probably acts as a rubbery cushion or mechanical buffer. Hence it is possible to utilise a blend of thermoplastic emulsion and amino-aldehyde in which the amount of amino-aldehyde is slightly reduced without adverse effect on crease-recovery but with beneficial results to ripping strength which is further improved by the thermoplastic compound itself. Most finishers who utilise these emulsion-polymers

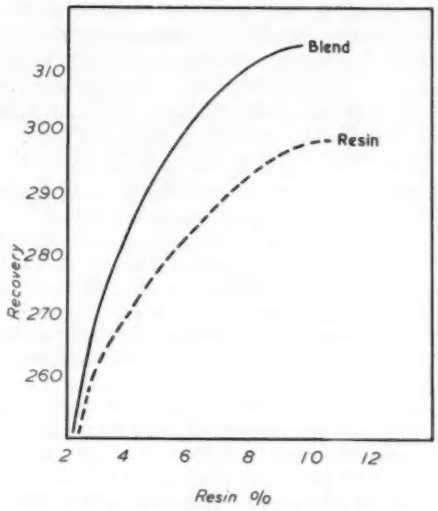


Fig. 2. Effect on crease-recovery of blends of thermoplastic emulsion and amino-aldehyde resin

generally operate in the region of 10% more or less, according to their ideas of a satisfactory finish.

The use of polymeric latices, as a means of correcting the embrittlement of crease-resisting cottons, has been examined in some detail by Abrams and Sherwood (Am. Dyes. Rep., 1954, **43**, 780). They utilised emulsion-polymers of acrylonitrile-butadiene, polyvinyl chloride, and various polyacrylates with particle size ranging from 0·06 to 0·20 microns; in general, the best ratio of latex to resin was 70: 30 calculated on the dry basis, when dimethylol ethylene urea was employed as the resin.

Increasing concentration of the latex in the mixture greatly improves the resistance to abrasion of the treated cotton fabric and, although the tensile strength and ripping strength are considerably improved compared with the resin-treated fabric, the strength is still below that of the untreated fabric. The best results were obtained with a butadiene-acrylonitrile emulsion, Hycar 1561, which contains a high proportion of nitrile, but there was some yellowing of the treated product after the test for chlorine-

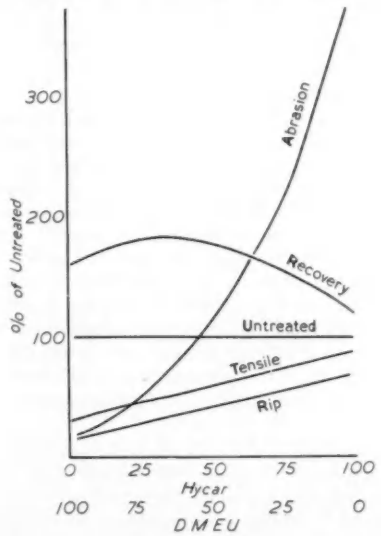


Fig. 3. Effect of additions of Hycar on physical properties

retention. With polyacrylic ester emulsions, there was no yellowing after a hypochlorite treatment, but the strength and abrasion resistance were slightly lower than with the mixture of D.M.E.U. and butadiene-acrylonitrile.

The latex plays a definite part in the improvement of abrasion resistance, tensile strength and ripping strength; these improvements are not merely the result of a decrease in the concentration of amino-aldehyde condensation product. The effect is generally at its best with the looser types of fabric structure.

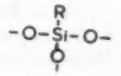
American workers rediscovered the fact that many of the thermoplastic polymer additives to the crease-resisting finish had a pronounced tendency to pick up dirt and dust; furthermore, during commercial laundering of white goods in the crease-resist finish these became soiled because the thermoplastic polymer softened and took up dirt from the hot liquors. This effect was termed "wet-soiling" and has been examined by Mazzeno, Kullman, Moore, Reinhardt, and Reid (Am. Dyes. Rep., 1958, **47**, 299 and 609) who confirmed the work of twenty years previously, namely, that crease-resisting fabrics have a reduced tendency to soiling but that when they also contain thermoplastic additives they acquire undesirable and pronounced soiling characteristics. It may be remarked that the polythene additives do not show this tendency to anything like the same extent as the acrylate polymers, nor do the silicone products when properly cured.

Silicones

Ever since the synthesis of tetra-substituted asymmetric silicon compounds by Kipping and his colleagues at Nottingham in 1901, there has been interest in organo-silicon chemistry, and amongst the compounds investigated were some obtained by hydrolysis of dialkyldichlorsilanes (R_2SiCl_2); these were called silicones by analogy with ketones. However, although the chlorosilanes hydrolyse, they do not behave in the same manner as their carbon analogues, for the product of hydrolysis polymerises to give compounds with a polysiloxane structure -Si-O-Si-O-, the main chain of which is not unlike that of silica. Since about 1949, commercial silicones began to be available.

In many respects these polymers may be regarded as intermediate between organic and inorganic compounds

The organic radical denoted by *R* is generally methyl or phenyl, but if the organic residues do not satisfy all the valencies of the silicon, then the chain-forming type represented above becomes a branching or cross-linking type shown below, i.e. trifunctional instead of bifunctional.

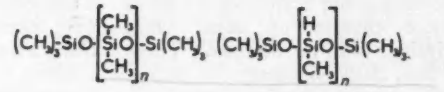


Hence one may have fluids, thermoplastic or thermosetting resins, with a wide variety of remarkable properties.

Although the fully methylated silicones, such as the linear dimethylpolysiloxanes exhibit a very strong water repellent effect, this requires temperatures of 200 to 250°C. for several hours; on the other hand, the application of methyl hydrogen silicones at 150°C. imparts an undesirable handle, so that the most widely used product for the textile industry is a combination of the methylated silicones and the methyl hydrogen compounds. Their general application for water-repellent finishes has been reviewed by Madaras (J.S.D.C., 1958, **74**, 813).

The joint application of amino-aldehyde products, or similar crease-proofing agents with polysiloxanes was examined by Marsh, Bell and Thompson as described in B.P. 695,703. The solution of the amino-aldehyde condensation product is mixed with a dispersion of an appropriate silicone and the necessary catalyst; impregnation, drying and curing follow the usual course. The treated fabric not only possesses a soft handle, but an improved recovery from creasing which is particularly evident in the wet state, so that only a minimum of ironing is necessary after laundering. If required, sufficient of the polysiloxane may be added to impart a high degree of water-repellency in addition to the crease-recovery effect. In many respects, this process represents the best type of treatment for cotton goods, for when properly applied the silicone product has excellent lubricating properties, and these do not interfere with the action of the amino-aldehyde.

The effect of silicone softeners on resin-treated cottons has been examined by Simpson (Text. Res. J., 1958, **28**, 170) with particular reference to a blend of two silicone polymers, dimethylpolysiloxane (*n* 500 - 600 units) and methyl-hydrogen-polysiloxane (*n* 40 - 60 units). This is



probably "Syl-soft." For water repellency it is customary to deposit about 1·0% of silicone on the fabric and to use a salt of zinc or tin as catalyst, but for softening effects the catalyst may be omitted and the amount of silicone may be reduced to 0·5% or less.

Most of the results obtained by Simpson refer to mixtures of dimethylol ethylene urea and methylated methylol melamine, but some relate to D.M.E.U. and polyvinyl alcohol or an acrylic resin. In respect of tensile strength, there was a slight decrease; ripping strength, however, was improved to a value which was roughly 50% higher than that of the resin-treated control. The cationic softener also showed an improvement but not to such an extent. For flex abrasion, the usual organic softeners appeared better than the silicone product, but an important observation was that the silicone softener exhibited a substantial improvement in crease-recovery and also in resistance to stitching damage. The silicones are generally superior for ripping strength, but not for tensile strength or abrasion, the greatest overall improvement being with the mixture of D.M.E.U. and M.M.M.

Some interesting comparative data on the effect of various additives have been provided by Garvey (Am. Dyes. Rep., 1955, **44**, 791). It is not possible however, to lay down simple rules about the best additive to apply, nor even whether it should be used with the impregnation solution or applied after the final condensation, though the latter method is more expensive with the silicones. Much depends on the type of cloth, for the emulsion polymers are probably preferred with the more open weaves and the silicones with tightly woven fabrics. Another important point is that the stability of the impregnating bath should not be adversely affected, and furthermore, the possibility of malodourous by-products should be kept in mind; many of the polyethylene emulsions contain non-ionic dispersing agents, but silicone emulsions may contain condensation products of organic amines and fatty acids or cetyl dimethyl benzul ammonium chloride.

New British Standard

Terms Used in Cloth Descriptions

The appearance and texture of most fabrics cannot be adequately described in words without technical details; they have to be seen and handled

By "TECHNICAL CORRESPONDENT"

THE British Standard Institute has published a Standard incorporating a glossary of terms used in cloth descriptions (B.S. 3257: 1960) which, so far as it goes, is intended to be helpful to the trade, especially in the wholesale and retail sections and to the consuming public. The Standard should be studied along with certain other Standards if a more complete picture of these cloth descriptions is to be obtained. These are "B.S. 2020—Glossary of terms: woven apparel fabrics containing wool," which was issued several years ago: "B.S. 2935—Description of woven and warp knitted fabrics containing man-made fabrics"; and "B.S. 2804—Glossary of silk terms."

There is no compulsion requiring that *all* such fabrics should conform to the standards indicated. But if any of the listed fabric names, or any of the other terms defined are used in the description of the material, then such material must conform to the definitions or descriptions given in the Standards. (If the general public were more stridently made aware of this fact, they might perhaps insist more often in being told exactly what they were buying.)

Fibre Tolerances

Reverting to B.S. 3257, this Standard is also meant to be useful to the average shopper in search of the right kinds of fabrics and garments. The document is divided into two parts. Part I deals with the general principles to be observed in describing cloths, and with the application of fibre terms. It prescribes the tolerances to be permitted when describing the fibre content of a fabric. Thus where a fabric is normally made from one kind of fibre only, there are allowances in the case of wool fabrics for inadvertent impurities, and in all fabrics for the introduction of small quantities of other fibres for decorative effects. If, however, in the descriptions of the fabric the name of the fibre is qualified by the word "all" or "pure," or the phrase "100%," the above tolerances are not permitted, with one exception, namely the allowance for inadvertent impurities in wool fabrics.

Where a cloth contains two or more fibres, these must be named in the order of their contents by weight. Thus a cloth containing 55% linen and 45% cotton would be described as being a linen/cotton fabric. But where a fabric contains less than 15% by weight of a fibre, either the fibre should be named along with the percentage content, or instead the phrase "and other fibre" or "with other fibre" should be used, with or without stating the percentage, but not naming the fibre. An exception to this proviso is that of a mixed fibre fabric containing 15% or more of wool, when no mention should be made of any other fibre in the fabric present to the extent of less than 10%, unless the actual percentage of the fibre present is stated. These exceptions for fabrics containing wool are due to the earlier publication of B.S. 2020, previously referred to, where certain conditions relating to these fabrics had already been established.

Glossary of Fabric Names

Part II of the Standard deals with a number of terms commonly used in fabric descriptions, and these include fibre, yarn, fabric and processing terms. They are set out in the form of a glossary, the descriptions being as far as possible of a non-technical character in most cases. There are not a very large number of these terms so listed but there is no doubt the glossary will create considerable general interest and probably some criticism. As is explained in the foreword, recent developments of new textile fibres and their uses in blends with the older well-known fibres, have made it most difficult for the ordinary shopper to identify these fabrics, especially where he or she has been accustomed to associating a fabric name with a particular fibre or blend of fibres. Sometimes new names have been given to these fabrics, but more often a traditional name has been used, mainly because the cloth construction has been similar to the original type of fabric, although the material content is partly or entirely different, and certain characteristics such as handle and draping properties may be nothing like those of the traditional fabric.

To re-define such terms in non-technical language cannot have been an easy task. For it means trying to reconcile the views and opinions of the elderly experienced shopper with those of the champions of the man-made fibres—the spinners, weavers and merchants who are engaged in making and selling the new fabrics which have been given the old names. One important statement intended to overcome in part this difficulty is that "any term which is used to describe the structure or weave of a cloth (e.g. 'flannel,' 'gaberdine,' 'gingham' should always be accompanied by a separate indication of its fibre content," so the elderly experienced shopper aforesaid may expect to see in the future window tickets naming "cotton flannel," "rayon flannelette," and similar (from her point of view) contradictions in terms.

What are "Generally Acceptable" Meanings?

In the foreword, it is stated that the cloth definitions should be "simple and generally acceptable." It is open to question, however, whether the descriptions given (they cannot really be termed "definitions," which the dictionary gives as "stating the precise . . . meaning of a word") are "generally acceptable." They may be acceptable in those sections of the industry where fabrics made from the newer fibres are being handled, but has the average man or woman who goes shopping

really "accepted" these new ideas of what a particular type of fabric should be like? The query arises not so much from the actual descriptive wording against each fabric name, but from the fact that so many of these names have been and still are associated with specific fibres, without qualification, by the public. In taking this view, middle-aged shoppers, for example, were right twenty or thirty years ago, and they are justified in arguing that they are still right, and that it is wrong to use the old familiar names for things which are very different in so many ways—in physical properties, in durability, in washability, in appropriateness for specific uses.

The Committee's Dilemma

So may be seen the dilemma confronting the Committee serving the B.S.I. Were they to revert to the older meanings, or were they to adopt the new meanings? The older meanings were not obsolete: indeed, for the layman they are even today the only meanings. It was mainly in the warehouses that the meanings were changing. But they had become established there. The fabric names were being used in everyday speech with the newer but much vaguer meanings, they were being used in orders and in invoices, and were flowing onwards into advertisements, in shop window displays and amongst the shop assistants. Was it too late to revert to the earlier meanings—too late because to do so would lead to even greater confusion? And if the new meanings were to be recognised, could the old school of the buying public be safeguarded—safeguarded in the sense of not buying something, for example, which they had always considered to be made of wool, and finding afterwards that it was made from wool-like man-made fibres?

The Committee appears to have adopted in the main, the latter course —the new meanings with the appropriate safeguards. They have done this by describing (but only to a limited extent) the physical properties or characteristics of the fabrics, these descriptions being based on their traditional features. Often they say of a fabric that it was "originally made of"—silk, or wool, etc., as the case may be, but, as already indicated, the general requirement is that the fabric name should be preceded by that of the material of which it is constituted.

But another problem which faced Committee has not been solved quite so neatly. As any expert knows, fabrics are often described in terms involving their construction, such as the weave, the counts of warp and weft, and the number of ends and picks per in. And there are recognised, if somewhat flexible, limitations to these dimensionsl figures, so that a particular kind of cloth becomes another kind when one or more of these factors passes beyond a more or less understood limit. It is all somewhat vague and doubtful, and this uncertainty must have confused the committee; yet to the expert in the trade the limitations are understood, and one kind of cloth is not easily passed off as another kind in his circles.

But what of the general public? Obviously such details would be meaningless, and even if they were not, the shopper could not be expected to go about with a cloth counting glass when purchasing textiles!

Attempting the Impossible?

So the Committee has had to fall back on very general descriptive terms, sometimes describing the properties of one fabric in terms of, or by comparison with, those of another. In the result, many of the descriptions are scarcely helpful at all, and the shopper will have to rely on his or her own judgment, based on experience (as hitherto) in deciding whether a shop-named fabric is of a kind (ignoring the fibre content) which he or she has been accustomed to seeing and handling under that name.

One fears that the Committee has attempted the impossible. The appearance and texture of most fabrics cannot be adequately described in words without technical details. They have to be seen and handled, and the average housewife could not recognise the fabrics merely by reference to the Glossary; she would need a set of samples as well.

That these limitations have been acknowledged by the Committee is shown by the fact that the Standard refers to "Textile Terms and Definitions," a work published by the Textile Institute, for more precise definitions, but obviously this reference is not meant for the housewife.

Prevention of Mis-Descriptions

One could easily pick individual "definitions" in the Glossary for criticism—many are too vague, some too technical (for the layman, that is) and no doubt these will be criticised. But is there any point in criticising something impossible of accomplishment? Undoubtedly the first part of the Standard, dealing with fibre content, will prove extremely useful, and should prevent a good deal of mis-description in the future. Cases of mis-description are, of course, ultimately proved by laboratory analyses of the fabrics, *not* by the consuming public, who may be merely suspicious. How, then, expect a fabric construction analysis which could show that the fabric was wrongly named, if the so-called definition of the fabric is as vague as they are in this same Standard? It would seem that to be consistent in this matter, the definitions should be such that the Standard could be used *as* a standard by the cloth analyst in the same way that it will be used by the fibre-contents analyst. Of course, they would be useless to the housewife. But how useful are the descriptions now published to her? Time will show if they are going to be really helpful. If they do prove helpful, then no doubt descriptions of more fabrics will be asked for by her. But one fears that if the trend towards using traditional names for fabrics made from new fibres is to be rationally controlled (or, as some might wish, is to be stayed) it will be by the issue of detailed technical definitions and not by vague descriptions. Incidentally, a number of the definitions prepared by the Textile Institute could be usefully narrowed down to closer limits in order to provide the cloth structure analyst with more satisfactory standards.

New Appointment

Mr. A. F. W. Remkes has joined Witco Chemical Co. Ltd., to promote sales of compounded latices, reclaim dispersions and general adhesives, etc. to the textile industry, throughout Europe. He will specialise in the carpet, felt and furnishing industries. Witco, well-known in the U.K., intend to increase their sales activity in Europe and provide a compreprehensive customer technical service to a growing market. At the Droitwich plant they manufacture synthetic and natural based latex compounds for tufted and traditional carpeting as well as speciality compounds for moquettes, fur fabrics and the non-woven industry. Reclaim dispersions are supplied to felt makers and matting producers. A synthetic latex plant is in course of construction at a site in the Midlands.

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New Sales Office

Albright and Wilson (Mfg.) Ltd. have opened a sales office in Imperial Buildings, 72 High Street, Belfast (Tel.: Belfast 32312). They produce a wide range of compounds based on phosphorus, including phosphates for the prevention of scale and corrosion in industrial etc. water systems; plastics chemicals; chemical intermediates; Calgon water softener and general chemicals.

S.D.C. Summer School

Textile Fastness Requirements

FASTNESS testing was of value not only to the production end of the textile industry but also to the consumer, observed Mr. F. M. Stevenson, M.Sc., J.P. (president, Society of Dyers and Colourists) when he opened the recent Summer School of the Society of Dyers and Colourists at the College of Science and Technology, Manchester. Compared with former days, requirements both by producer and consumer had widened and would continue to do so. Fundamentally the consumer's requirements were the same, viz. adequate performance in use. What had changed was the interpretation of "adequate" and the much wider sphere of usage, he said.

Modern fabrics had to be fast to usage in chlorinated swimming bath water and to sea water; in the old days sea water bathing was reserved for the privileged few who bathed from secluded beaches or horse-drawn bathing huts. In former days garments were intended to cover the body from prying eyes; not to adorn it with intriguing patterns. Hence, the requirements as to colour fastness was secondary.

The requirements of the producer had also widened with widening of the many techniques now practised. Examples were crease-resist finishes on rayons; heat treatment of thermo-plastic fibres; changes in usage of solvents in the dry-cleaning industry and of new resins in the paint industry. No doubt many new requirements were still to come to light; already specialist fields were showing up the gaps which still existed. We lived in stimulating times, when constructive thinking could still make its contribution, continued Mr. Stevenson. The great encouragement was that, whereas at one time there was little or no will to collaborate for the common good, it was now recognised that only through collaboration could rapid agreement be achieved and confusion avoided. Individual laboratories did the bulk of the detailed work but co-ordination of effort was secured through the sponsorship of the Society and similar bodies both here and overseas.

Fastness of Textiles to Burnt Gas Fumes

DEVISING a satisfactory test for fastness to burnt gas fumes had proved to be rather more troublesome than was anticipated, said Mr. E. Stanley, M.Sc., Tech. (British Celanese Ltd.). The reason why cellulose acetate was more susceptible to gas fading than other fibres was probably that oxides or nitrogen were soluble in this fibre and were retained much more tenaciously than in cellulosic fibres, polyesters or polyamides.

The search for blue disperse dyes which would be more resistant to gas fading than the present anthraquinone blues had been along two lines. First, new structures as typified by Artisil Blue GFL (C.I. Disperse Blue 20) which was probably a derivative of naphthoquinone amide and, secondly, by modifications to the typical anthraquinone dyes. It had been shown that introduction of negative substituents gave more resistant dyes, a nitro group in the 5 position giving Eastman F Blue GLF its high resistance to gas fumes, whilst cyano groups in the 2 and 3 positions rendered dyes of the 1 amino 4 alkylamino type much faster. These improvements in gas fading fastness were accompanied by difficulties in application due to poor affinity, sensitivity to alkali, etc., but no doubt eventually a dyestuff of satisfactory all round properties would be found.

An alternative to using the non-vulnerable blue dyes with their attendant dyeing problems was to protect the sensitive dyes with gas fading inhibitors. These were basic compounds of two main types: (*a*) substantive inhibitors which had affinity for cellulose acetate and could be added to the dyebath from which they were absorbed along with the dyestuffs and (*b*) non-substantive inhibitors, e.g. compounds such as triethanshamino which must be applied as a finish.

Although inhibitors had disadvantages they were of definite value in protecting goods during storage and usually allowed them to reach the user safely. Another interesting method of increasing the resistance of cellulose acetate to gas fading was by partial saponification. After relating methods of testing, Mr. Stanley concluded by discussing another type of fading which was allied to gas fading in that both were caused by minor constituents of the atmosphere. This type of fading had been investigated in America during the last 5 or 6 years and had been called "O" fading since it was presumed to be caused by ozone in the atmosphere.

It had been observed that a number of acetate fabrics when exposed in various localities under conditions which seemed to rule out the effects of sunlight or gas fumes, faded more rapidly than had been expected as a result of laboratory tests. Blue or blue containing shades were chiefly affected and concern was felt since many of them had been dyed with gas and light fast dyestuffs of the Eastman F Blue GLF type. Further exposures showed that other blue dyestuffs were similarly affected although none showed the typical reddening of shade associated with gas fading, but rather a loss of depth or bleaching effect.

Fading was found to vary from place to place and was more severe in June than January. A surprising feature was that this type of fading was encountered most frequently in non-industrial and country districts rather than in the towns and cities.

After numerous tests it was concluded that ozone was the active destructive agent and measurements of the amount present in the atmosphere gave figures varying from 0·25 to 6·25 pts. per 100 million. As ozone was an extremely active oxidising agent it would be expected to react with impurities present in industrial atmospheres and consequently less might be expected in these localities. This may explain the findings that this type of fading was more severe in country districts than in the large towns.

"O" fading has been observed chiefly on acetate fabrics dyed with disperse dyes but polyesters had been found to show similar fading. Triacetate which had not been given a heat setting treatment was more sensitive than secondary acetate but its resistance increased considerably after setting. The times required to produce a similar degree of fading on Arnel, secondary acetate and heat-treated Arnel were reported to be in the ratio 4 : 7 : 18. Fading on triacetate and polyesters was also reduced if they were dyed with carriers, presumably due to better penetration of the dye. All the usual blue and violet dyestuffs tested in addition to a number of reds and yellows, were found to be sensitive when exposed to a stream of ozonised air but fading was reduced by many of the usual gas fading inhibitors and also by unsaturated compounds such as di allyl phythalate.

"Commercial complaints which could be attributed to 'O' fading have not to our knowledge been experienced in Britain and it may be asked why they have only been recognised in the United States during the last few years," said Mr. Stanley. One explanation which had been put forward was that until recently most dyeings on acetate were protected with gas fading inhibitors which reduced "O" fading but the present extensive use of blues fast to light and gas fading which were dyed without inhibitors had revealed this type of fading. This was not entirely convincing and further information regarding the incidence of "O" fading as well as the origin and reactions of ozone in the atmosphere were needed.

S.D.C. Summer School

Fastness of Dyed Goods to Washing

TO the general public the only fastness properties of any significance were the three which constituted the Society's First Fastness Report in 1934, i.e. Light, Perspiration and Washing, and of these perspiration was probably less important than fastness to light and washing, observed Dr. J. F. Gaunt, Ph.D., F.R.I.C., F.T.I. (Patons and Baldwins Ltd.) when his paper was presented at the Summer School of the Society of Dyers and Colourists. (Owing to indisposition, Dr. Gaunt's paper was read for him.)

Each of these was all important in certain end-uses, he went on, e.g. light fastness in heavy curtains, carpets and ladies' coatings which were dry-cleaned rather than washed. In the case of shirts, tablecloths, knitted underwear and outerwear, washing fastness was the paramount requirement. Dr. Gaunt noted that it was of interest that public condemnation of optical bleaching agents was concentrated on (*a*) change of tone of dyed cellulosic fabrics due to uptake of O.B.A. from domestic detergent and soap powders, i.e. during domestic washing, (*b*) catalytic wet fading of wool, i.e. fading associated with washing.

Dr. Gaunt said that the need to have standard washing tests had been well appreciated for over 50 years and it might as well be stated here and now that the position today was probably more complicated than ever before. After reviewing development in this field Dr. Gaunt said that work on washing fastness testing as reported in the 1948 Report was hardly complete before yet another Washing Fastness Sub-Committee was set up by the Society in 1950. This was done largely in an attempt to obtain internationally acceptable washing fastness tests at the request of the International Standards Organisation. In the early days of the Committee, an attempt was made to meet the wishes of European members of the International Standards Organisation, to have a series of tests which could be carried out in open beakers in a water bath, with manual agitation.

In the third report of the Fastness Tests Co-ordinating Committee published in June, 1955, seven standard washing tests described but one had been withdrawn in 1958, leaving six recommended tests.

After considering the six tests in detail, Dr. Gaunt observed that it was depressing to have to give a list of objections to the various tests. There was virtually no possibility of their becoming adopted as international standards and even in this country criticism had been raised against several of them, he said.

It would be wrong to suggest that there was any kind of finality about the present methods of washing fastness testing used anywhere in the world. This might be due to the fact that the washing of textiles was such a complicated operation in that the washing medium varied so greatly from country to country, and from fibre to fibre, whilst in addition to the change in shade of the material under test, the effect of adjacent undyed material was often of even greater importance.

To sum up, the position of washing fastness testing was very disappointing at present. Conditions were changing rapidly, both with the introduction of new types of fibre, new types of washing machine and washing preparation and in changing demand of the public for washing fastness, so that what was good enough today may very well not be good enough tomorrow or next year. The best one could hope for was for the Society to keep a close watch on all the factors.

Durability of Textile Finishes

DISCUSSING the durability of textile finishes, Mr. A. R. Smith, B.A., B.Sc. (Oxon.), F.R.I.C. (B.I.P. Chemicals Ltd.) said that the final assessment of a durable resin finish must be physical rather than chemical. It was not sufficient to establish that the chemicals used in producing the finish were not removed by repeated washing; the desirable physical properties imparted to the fabric by the finish must remain substantially unchanged during their wearing life of the material.

Referring to problems involved in assessing durability, Mr. Smith said that experience had shown that a creaseproof fabric would retain its improved properties through a series of washes provided that the resin content was not significantly reduced. The durability of conventional creaseproof rayon fabrics could therefore by realiably assessed by estimating the loss of resin on washing. The more recent "wash and wear" or "minimum iron" cottons could be evaluated in the same way if it was remembered that a higher standard of durability was usually required, in cotton shirtings, for example, than in rayon dress goods. Two methods of estimating resin content were based on: (*a*) loss of weight on stripping the resin from the fabric and (*b*) estimation of the nitrogen content of the fabric.

Durable effects produced by mechanical means such as glazing, embossing and schreinering, were not easy to evaluate quantitatively. Correct processing and satisfactory resin cure were both important in achieving adequate dimensional stability.

Durable stiffened finishes could be applied with amino-resins on synthetic materials such as nylon and "Terylene" as well as on cellulosic fabrics. Stiffening of cotton or rayon could be achieved by using a partially polymerised resin that did not penetrate the fibres or a conventional creaseproofing resin in conjunction with an additive of high molecular weight such as starch or polyvinyl alcohol. By a suitable choice of component, a creaseproof, stiffened fabric could be produced.

"Durability of stiffened finishes is largely dependent on the extent of mechanical breakdown of the effect during washing and this must always be borne in mind. Laboratory test procedures may often prove unsatisfactory for this reason," said Mr. Smith.

Durable water-repellency and resistance to water-borne stains could be successfully achieved by application of silicones or stearamide-based products. Their practical value was, however, extremely dependent on the washing and rinsing conditions employed. Rinsing must be thorough so as to remove all traces of soap or particularly synthetic detergents, which could completely neutralise the water-repellent properties of the finish. Inks frequently contained wetting agents and their use to demonstrate the resistance of a fabric to staining was therefore highly inadvisable. The durability of water-repellent finish was frequently assessed by determining the spray rating. The figure obtained was extremely dependent on the conditions of test and the fabric must not only be rinsed thoroughly after washing but it must be completely dry. A light ironing before testing was therefore advisable, if consistent results were to be obtained.

A special aspect of resin finish durability, particularly in the case of minimum-iron white shirtings, was resistance to chlorine bleaching. Urea and melamine-formaldehyde were susceptable to attack by chlorine when the treated fabric was bleached with hypochlorites.

The use of hypochlorite bleaches in home washing or in laundries was widespread in the U.S.A. and in some European countries and this had stimulated the development of resin finishes resistant to chlorine. The use of such finishes had now extended to this country and the assessment of their durability raised special problems.

Mr. Smith then discussed experimental work during which he mentioned some factors affecting chlorine resistance. The resistance to chlorine or finishes based on dimethylol ethyleneurea could be fully satisfactory when a suitable accelerator such as zinc nitrate was employed and a "hard" cure given. Under normal processing conditions, however, the chlorine resistance might be inadequate in some respects. In particular, deterioration in chlorine resistance might occur on storage of fabric and subsequent washing, and this effect was more noticeable at lower resin concentrations.

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TAS/HY14

Hungarian Textile Developments

Over thirty extremely interesting papers were given at the tenth annual conference of the textile industry organised by the Hungarian Technical and Scientific Society in Budapest. Abstracts from four of the papers are given below

New Hungarian Silk Looms

By M. JEREDAN*

IN September 1957 the Hungarian Silk Industries Co. decided on the manufacture of silk looms and an assignment was given for the design of a single-shuttle high speed silk loom. Production of the prototype was accomplished in two years, and series production of the loom began in 1960. The type produced was for weaving plain silk cloth at 180 - 190 p.p.m. An investigation of the products within the silk weaving industry indicated that 31·4% of the silk cloth could be woven on plain single-shuttle looms.

Further development (equipping with change box motion, non-stop system, and automatic warp let-off) was completed in 1960 and production of these automatic types is expected to commence in 1962. The design of alternatives equipped with drop-box motions, crepe and four-box change motions, and multi-shuttle automatic motions is also projected to widen the scope.

The loom is characterised by enclosed side framing and constructional groups forming separate fitting units, which conform to modern loom design requirements. In the interests of high speed the weight of the frame is considerable and this, in conjunction with the suitable lightened slay, ensures smooth vibration-free operation of the loom.

The main shaft and picking motion shaft run in ball bearings and the drive is by a multiple disc friction clutch built in the unit with an internal shoe-type brake. The motor is connected to the shaft clutch through gear wheels. The inertia masses of the loom are considerable. Of these, 38% of the combined inertia moment of the shaft and clutch is represented by the rotating component of the clutch, thereby affording favourable acceleration conditions.

For high speed work it was necessary to reduce the weight of some parts and the connecting rods, slays, picker components and drop-box end walls were made of aluminium alloy. In designing the drive and slay the aim has been to make provision also for looms wider than the present 110 cm.

The shedding motion conforms with the requirements of a loom without superstructure. Motion is imparted to the harnesses through the stirrups by double eccentric cams located below the slay. Harness and healds are connected by non-stretching elements. The dimensions of the front shed are determined by shuttle flight conditions and, as a result, the harness motion forms a basis which cannot be altered for loom setting purposes. Shedding strain is adjusted by altering the dimensions of the back part of the shed only. This facilitates simplification of gauge setting as the warp droppers and back bearer can be set accurately to the scale required.

Two take-up motions are at present being investigated. One is the customary ratchet wheel arrangement while the other is a new design take-up providing constant tension on the warp. The cloth roll, located independantly from the take-up, can be changed without stopping the loom.

The weft feeler, centre-weft fork and warp-stop function on electro-mechanical principles, e.g., the feeler operates mechanically, but the signal is transmitted electrically by means of a signal element. When a fault arises, an electro-magnet disconnects the starting gear and a pilot lamp indicates the position of the fault and remains lit until the fault is found and the loom restarted.

The oil-hydraulic shuttle buffer is a new design. With the fluid brake used the pressure caused by shuttle impact is equal at both sides, due to a communicating tube connecting the working areas. A further advantage is that the rate of progress of the bumper can be regulated to the loom speed, thus making it possible to provide correct impact conditions for all loom speeds. The picking motion is also worthy of mention. It is of the customary bottom eccentric cam design with the picking shafts inside the loom. Pneumatic stops are provided for the picker sticks. The new loom occupies less space than comparable looms of similar reed width and the warp beam stand is attached to the framing.

* *Budapest Technical University.*

Continuous Linen Bleaching

By A. SZEKELY*

IN continuous linen bleaching the problem arises, that while numerous articles have to be bleached, the actual quantities of each article treated at one time are relatively small. Special problems were presented by the bleaching of coloured woven fabrics because of the small space available for erection of equipment and by the existing reel bleaching vats.

The equipment was the J-tower system and the sequence of the processes was as follows: impregnation with boiling bleach liquor in a double immersion impregnating machine; steaming and resting in the J-tower, rinsing in tight rope washing machine; three-fold hypochlorite impregnation and conditioning in reel vat and J-tower; water bath reduction of hypochlorite concentration in reel vat; hydrogen-peroxide bleaching in reel vat and J-tower, rinsing, followed by optical bleaching in reel vat. Processing flow speed of the material is 30 m./min.

Detail problems solved during the course of designing the equipment included:—

(1) Impregnating and steaming of colour woven fabrics took place in a neutral sodium sulphite solution in order to prevent running out of the vat dyes.
(2) Repeated hypochlorite impregnation and conditioning permitted the use of solutions of mild concentration on the one hand, while on the other hand a better bleaching effect was obtained due to the carbon dioxide content of the ambient air.
(3) Activation of hydrogen peroxide by hypochlorite of low concentration was also considered a new development in Hungary.

* *Textile Research Institute*

Lower U.K. Top Stocks

Stocks of tops in the U.K. declined from 73 million lbs. at July 31, to 67·1 million lbs. at August 31 last, announces the Wool Industry Bureau of Statistics. Of the reduction, 4·8 million lbs. was in merino qualities. Wool stocks in the U.K. at August 31 were 243·1 million lbs. (clean weight)—an increase of 8·9 million lbs. which was chiefly due to a seasonally heavy intake of domestic wool by the British Wool Marketing Board.

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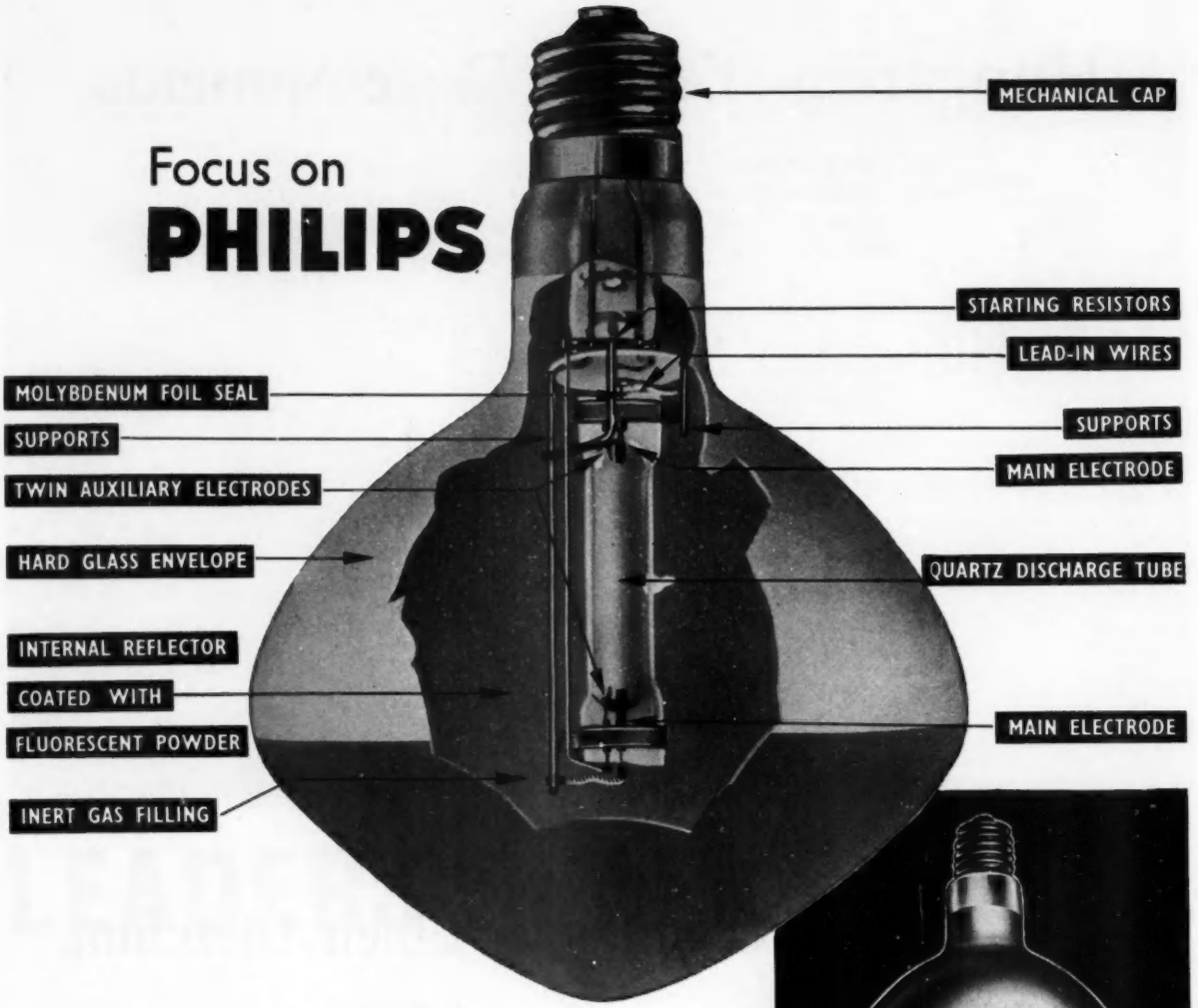

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The Thermotex Process: Recent Results

By Dr. I. RUSNAK

A FULL-SCALE Thermotex plant was installed on the premises of the Pamutkolor Co., and on this plant it was possible to adapt numerous solutions developed on laboratory and semi-production scale, to full production working. Detailed examination was made of the pre-treatment temperature, temperature of processing solution, material quality of gas adhering to the surface of the fabric, method of indicating moisture content of fabric and the ambient atmosphere, fabric structure, number and type of processes preceding heating, and the chemical composition of the fibre.

Two full-scale production Thermotex plants were completed, one for processing fabrics and the other for yarns. In the design of these, rapid and practical results were given preference over economic operation. For this reason, heating was by quartz tubes producing the most rapidly heating infra-red radiation. Both plants consisted of a cabinet open at one end whose width corresponded to the width of the fabric and through which the fabric was passed vertically upwards and downwards where it is heated to the required temperature. Speed of the fabric travel was determined by a mechanism applied after the heating cabinet. A speed range of 10 - 15 m./sec. was provided for fabric temperatures of 120 - 140°C. Designs have been prepared for revised equipment providing more economical heating through a combination of steam, electricity and infra-red radiation.

Experiments on sizing carried out on some cotton yarn types demonstrated the importance of correct count and twist, quality of sizing material, pre-heating temperature, and degree of squeeze, in relation to tensile strength and elongation. Yarn dyeing experiments on cotton yarns on laboratory and semi-production scale were aimed at developing the most practicable and advantageous solutions and recipes and processes were developed for vat, sulphur, Indigosol and Naphtol dyeing.

A large scale method was evolved for potassium persulphate, monochlore-urea, caustic, peroxide and Rapidase type enzyme desizing, by application of the Thermotex method.

A method was developed in continuous boiling, for application of the Thermotex pre-treatment before alkali saturation of the grey fabric and prior to adding the lye in jigger boiling. Processes and recipes were developed for all alkali boiling where lye solution was used as the first wet processing of the fabric.

Tests were conducted in finishing with a view to improving the uniformity of starch sizings and increasing the penetration of the starching materials. Thermotex pre-treatment was tried before calendering, for improving the effect in the durable lustre finishing process. As a result of the large-scale experiments carried out, installation of Thermotex pre-treatment units was considered necessary at the first wet operating stage of the firm's continuous bleaching plant, at two slashers, and at two continuous dyeing ranges.

Automatic Looms in the Second Five Year Plan

By F. KOTANYI*

IN the second 5-year plan 30% of the cotton looms will be replaced by modern automatic machines and the types selected are: AT 100-5 M of Soviet make, Type No. 1511 of Chinese make and Type ES II Czech automatic looms with box changing motions.

This paper discussed the possibilities of reaching international standards by using these machines. Investigations were directed to gross rate of machine-efficiency, picks per hour and machines per worker (weaver + refiller) against yarn breakage rates in warp and weft, standstill and loom speed.

According to experiments carried out in factories with cotton and rayon fabrics, the gross rate of picks/hour were far below international level, due mainly to the high rate of warp and weft breakages, also an elevated rate of standstill. Ends-down per 1,000 warps per 1,000 picks: 0·8; weft breakages 1·5 - 2·4; standstill 6 - 14%.

Causes of Breakage

Cause	Breakages, % Warp	Weft
Spinning	69	76
Preparing ..	18	17
Weaving	13	7
Total ..	100	100

Suppose an improvement of 20% could be obtained in spinning and 80% in preparing, breakage rates might reach or at least approach international level:—

0·14 - 0·19 breakage of warp per 1,000 ends .. } for 10,000 picks
0·45 - 2·09 breakage of weft per 1,000 ends .. }

By analysing the possibilities of reducing standstills it had been established that improvements to be obtained by the use of the types of machine mentioned lay at 3·5, 4·5 and 5%, respectively. The gross rates of picks per machine hour which could be achieved after arriving at the mentioned breakage rates and standstills correlated well with international data.

All requirements calculated on this basis and prescribed by the direction of the cotton industry could therefore be regarded as realistic and as a task which could be fulfilled. The quality of fabrics made during experimental processing—and especially that of rayon fabrics—were rather poor: the proportion of first-class fabrics varied between 60 and 84%. The main problems and the most important tasks were (*a*) establishment of the right varieties of goods to be woven, (*b*) a service of spare parts and accessories and (*c*) thorough preparation of warp and weft and adequate training of workers.

The present rather variegated production line was a serious obstacle in efforts to reach international level and largely responsible for insufficient quality.

The cause of breakages arising from bad preparation lay mainly in lack of discipline and the employment of "training manuals" approved some time ago was recommended. Training of manpower, especially supervisors, should be organised in the form of special quick-training courses.

* *Kispest Textile Factory*

New Reactive Disperse Dye

Procinyl Rubine B, a new dye announced by I.C.I. Ltd., makes possible the production of deep rubine shades, hitherto not feasible with Procinyl dyes. Primarily intended for application to nylon and other fibres of the polyamide class, it is also of interest for synthetic fibres of the unmodified polyacrylonitrile type. Like its four predecessors Procinyl Rubine B on nylon combines the advantages of a disperse-type dye with the extremely good wet fastness that results from chemical combination of the Procinyl dye with the fibre. The method of application to polyamide fibres is the same as for earlier Procinyls, i.e. exhaustion of dye from an acid medium, followed by fixation under alkaline conditions. Dyeing is carried out in conventional equipment.

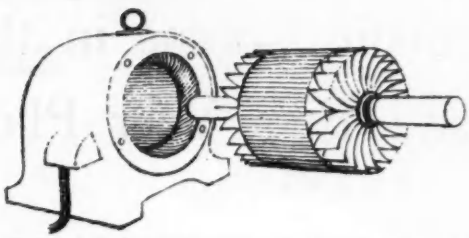
CUT HERE

Electric Motors & Controls 1

Most manufacturers today employ electric motive power through individual drives, which, among their many advantages, permit the right type of motor to be used for each of various types of machine. The range of motors available—each with its own characteristics–is very large, and the factory executive could well be guided in his choice by the expert views of the motor manufacturer, the installing engineer or his Electricity Board's engineer. The characteristics of the main types of motor are briefly summarised below.

Squirrel-cage Motors

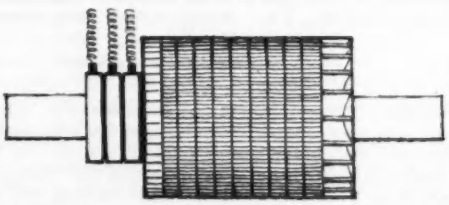
These are the most straightforward and simple in design, and are therefore relatively cheap and robust in character. They should be considered for general duties and, in conjunction with variable-speed gears or couplings, for applications requiring variable speeds, e.g. for crane drives. Small sizes can be switched direct-on-line.



The squirrel-cage motor is very suitable for individual drive of each motion of single-purpose machine tools where the motor horsepower can be precisely specified. It is suitable for driving pumps, fans, lifting hoists and woodworking machines. Textile machinery represents another field of use.

Slip-ring Motors

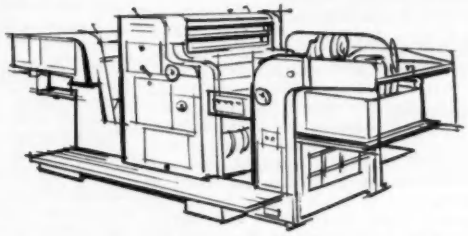
The chief advantage of the slip-ring motor is a very low starting current for a given torque, e.g. full-load torque at starting with a current about 10% above full-load current. This makes it suitable for applications requiring a prolonged starting period with a



load of high inertia. It also permits of speed variation below synchronous speed, though with some loss of efficiency. Typical applications include fans, pumps, heavy lathes, grinders and boring mills, as well as calendering machines, cable-laying-up machines and mine hoists.

Three-phase A.C. Commutator Motors

The main characteristic of this type is variable-speed with uniform and gradual acceleration and good efficiency over the speed range. Paper manufacture provides excellent examples of its use, e.g. in paper-making, reeling, cutting, calendering, coating and drying.



A.C. commutator motors are recommended for mechanised bakeries and for cranes and hoists where very slow speeds are frequently needed.

Synchronous Motors

These are constant-speed motors. One particular advantage is that they can be operated at unity or even at leading power factor to correct a system suffering from lagging power factor, and perhaps so qualify for a reduction in the electricity bill. Pump and compressor drives are typical uses to which they can be put. They are also used in motor-generator sets.

Single-phase A.C. Motors

In general, single-phase motors are used in light industries for drives not requiring more than about five horsepower or where a three-phase supply is not available. While their use is mainly limited to work of a light nature, they do fill a need in such duties as sewing-machine drives, portable hand tools, window opening and closing gear, etc.

Direct Current Motors

For a completely unfettered performance where wide ranges of speed variation, high rates of acceleration and powerful dynamic braking are all-important, the D.C. motor is unrivalled. This means in effect the installation of an A.C.-D.C. motor-generator set or rectifier to give the necessary supply, but the increased cost may well be compensated by the improvement in productivity. When variable voltage is applied to the armature, a wider speed range is obtainable than with any other type of motor. Typical applications of the D.C. motor are: cranes, haulage and tippler equipment, certain machine tools requiring a large speed range and smooth acceleration, high-speed printing and steelworks drives.

For further information, get in touch with your Electricity Board or write direct to the Electrical Development Association, 2 Savoy Hill, London, W.C.2. TEMple Bar 9434.

They can offer you excellent reference books on electricity and productivity (8/6, or 9/- post free)—"Electric Motors and Controls" is an example.

E.D.A. also have available on free loan within the United Kingdom a series of films on the industrial uses of electricity. Ask for a catalogue.

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Reviews

STANDARD VALUES FOR IRREGULARITY IN COTTON SPINNING. Zellweger Ltd., Uster, Switzerland. "Textile Manufacturer", Emmott and Co. Ltd., 31 King Street West, Manchester 3. (price 6s. post free).

Many changes have been made during the last decade in methods of evaluating the characteristics of cotton yarns. For a great number of years, the blackboard method of judging yarn levelness was the only method used and, despite its limitations served, and still serves a useful purpose. The modern methods of electronic measurement, however, are more precise, less time-consuming, and more scientific in their application and, moreover, embrace all forms of material from lap to spun yarn. Most of the firms who are equipped with the modern electronic instruments, whether they be spinners or users of cotton yarns, have during their experience with the instruments, built up some ides of their own yarn standards, but probably have only a slight idea of how their standards compare with the rest of the trade. This disadvantage has now been eliminated by the publication in English of tables of standard values for irregularity in cotton spinning compiled by Zellweger Ltd., Uster, Switzerland. The tables have been based on innumerable tests carried out all over the world, and it is interesting to note that previous values were revised in 1952. Since then, due to considerable improvements in certain processes, the values have had to be again revised, and the present tables represent these revised values. Consequently, they constitute a valuable auxilliary means for spinning mills to assess their efficiency in processing.

The tables give three levels of irregularity for all processes and hanks, indexed as "even", "average" and "uneven". The value "even", is understepped only in very rare cases, and the value "uneven", represents the presence of considerable machine faults or unsuitable settings, and as proved by experience, products lying in this field, lead to all kinds of difficulties in subsequent processes. On combed materials, provision has been made in the tables for differences in fibre fineness, and on carded materials, two values are granted for each level of irregularity, the lower value referring to better quality and the higher value to worse quality of the raw material.

All the values are quoted in both U% and CV% to provide for the different methods of expressing results, and in addition the tables include standard values, again classified into the three levels-"even," "average," and "uneven"—of the irregularity index. This index is the ratio between the measured irregularity and the calculated limit irregularity, and in the case of an ideal yarn or sliver, the value of this index would be 1. This value is never achieved in practice, and the worse the material, the higher will be the index figure. Separate tables are also provided for the standard values of irregularity of scutcher laps and ribbon laps, and in both cases, the grades are classified into six classes, namely—"very even," "even," "average," "uneven," "very uneven," and "extremely uneven." The standards are given in U%, CV% and also R%, which is the % range of yard to yard variations, an expression which is popular in the U.S.A.

An extremely useful addition, is a suggested scheme for carrying out quality control tests in a cotton spinning mill by means of the eveness tester. For mills equipped with the Uster imperfection indicator, graphs are provided showing standard values for neps and thick places, in both carded and combed yarns, and the values are shown for two separate degrees of sensitivity of the instrument. An outstanding feature of the publication is the number of actual test diagrams that are reproduced for all processes and various hanks, showing the differences in appearance of the three standards, and these afford a quick means of visually comparing actual tests against the standards. The publication is well presented, brief and yet clear in reading matter, and should be an indispensable feature in the testing departments of all spinning firms, research departments and institutes, technical colleges and universities catering for textiles.

J.D.

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LABORATORY INSTRUMENTS. A. Elliott, PH.D., D.SC., and J. H. Dickson, M.SC. Chapman and Hall Ltd., 37 Essex Street, London, W.C.2. (price 55s. net).

Dealing mainly with the design and application of laboratory instruments the first edition (in 1951) of this book was an immediate success based, as it was, on the accumulated experience during many years of research work. In nineteen chapters and over five hundred pages the volume embraces properties of materials used, casting and jointing of metals, magnification of small displacements, sensitivity and errors of instruments, isolation of apparatus, damping, tests for straightness, etc., types of glass, working of glass, lenses, etc., optical instruments, radiation and photometry, photography in research, corrosion in instruments and its prevention.

This revised second edition includes a fuller account of plastic materials in the chapter concerned with the properties of materials. This same chapter also introduces the subject of corrosion-resisting metals and a completely new chapter has been introduced on the subject of corrosion in laboratory instruments. The appendix on optical crystals has been enlarged into a chapter with the latest information on the refractive index of materials useful in infra-red spectrometry. A new section on radiation has necessitated another new chapter which also includes the section on photometry. New matter has been added on colour vision, lenses and photography; photographic resolution has been treated much more fully. Similarly, new information on glass protection against radiation hazards has been added. Adequately illustrated with clear, precise diagrams, this excellent book is well printed and bound. Fully indexed, it also has many references to other published work at the ends of the chapters. It is a pleasure to recommend this to all engaged in research work, also all students in grammar schools, technical colleges and universities.

R. Keith

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FAIRCHILD'S DICTIONARY OF TEXTILES. Fairchild Publications Inc., 7 East 12 Street, New York 3, N.Y., U.S.A. (price $25).

Edited by Mr. Steven S. Marks (*Daily News Record*) this fine book of over 12,000 definitions is undoubtedly one of the finest of its type. No work of this nature can ever be complete in view of the enormous field encompassed because continuous development in every section of the textile industry including new machines and techniques, new fibres, yarns and fabrics, finishes, terms and definitions arise far faster than books on this subject appear. In over 600 pages the book contains a marvellous selection of specific definitions covering fibres—natural and man-made—fabrics and finishes, in addition to the end-uses of cloths including clothing and accessories, furnishing and household textiles and decorative materials, etc.

Over ten years' work was involved in the preparation of this dictionary and no pains have been spared to make it as complete as possible. In many places where comparable cloths have been given different names in various countries, these have been reconciled. Similarly, wherever possible, botanical names of fibres have been included to enable comparisons to be made of fibres seemingly different because of local or nature terms. The arrangement all through has been excellent and the information contained is easily and rapidly found. Beautifully bound and printed in an excellent type-face, it warrants a place in every textile, technical and commercial library, and no textile business of any kind should be without it. No one can hesitate to recommend such a worthy publication.

D.E.E.

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AUTOMATION AND SKILL. E. R. F. W. Crossman. Department of Scientific and Industrial Research. H.M. Stationery Office (price 3s. 6d.). This booklet is No. 9 in the excellent series "Problems of Progress in Industry" which present briefly and simply the results of research into the economic, technical and human problems of industrial progress. Continuous flow production, programme-machines and centralized remote control are dealt with, followed by maintenance work in automatic plants, working conditions, supervision, responsibility and social skills and personnel problems for management.

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AMERICAN, EGYPTIAN AND INDIAN COTTON—WILT EUSARIA. Technical Bulletin No. 1219, U.S. Dept. of Agriculture. Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C., U.S.A., (price 15 cents).

This booklet reviews the literature on the subject and gives the results of (a) inoculation of varieties of cotton 5 species with races 1 and 2 of the U.S. cotton—wilt *Fusarium* (b) inoculation of 2 varieties of upland cotton with isolates of *Fusarium* from wilt—nematode sites (c) inoculation of cotton and other plants with the U.S. race 1, Egyptian and Indian cotton—wilt *Fusarium* (d) inoculation of cotton with wilt *Fusarium* from other plants

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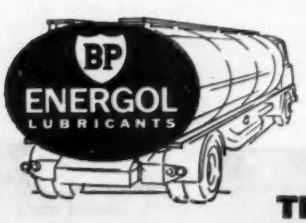

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THE MILLOWNERS' ASSOCIATION, BOMBAY. REPORT FOR THE YEAR 1959.

During 1959, the third year of the second five-year plan, agricultural and industrial production in India reached higher levels in most branches, a notable exception being cotton textiles, in which cloth-output ran roughly parallel to that of the previous year. Despite this advance, inflation reared its ugly head, The standard of living remained lamentably low and the attainment of a per-capita income of Rs. 300 a year by the end of the current plan would seem to be impossible. The authors of these two volumes are to be thanked for an excellent account of a busy, difficult yet not unfruitful year and for the space which they have given to the legislation, inquiries, committees, meetings and conferences which influenced the textile industries during the period. Very full statistical tables add support to the text.

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STEEL PATTERN CARDS FOR BOX MOTION CONTROL ON LOOMS. British Standards Institution, Coronation House, Market Street, Manchester 1 (price 4s. 6d.).

This new publication (B.S. 3267:1960) prescribes a range of steel pattern cards for shuttle selection on automatic and non-automatic looms fitted with revolving-box or drop-box motions. A foreword states that the standard "will assist production in several ways; a reduction in the variety of types will enable manufacturers to produce stock items in quantity with confidence, and should relieve users of the need to carry a wide range of replacements." The new standard provides the user with information on steel spacing clips, wire rings and lacing cord. The range of cards provides for their selection of any one from a maximum of six shuttles. There are 29 fully annotated diagrams.

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MOISTURE IN TEXTILES. Edited by R. H. Peters and J. W. S. Hearle. Textile Institute and Butterworths Scientific Publications, 4 and 5 Bell Yard, London,W.C.2 (price 40s.) American edition Textile Book Publishers Inc., New York, N.Y., U.S.A. ($6-50).

Based on a series of lectures given on a course organised by Dr. J. M. Preston at the Manchester College of Science and Technology, the thirteen chapters comprising this book have been written by seven different authors, all specialists in their particular fields. Most of the contents centre around (a) the relationship between the moisture content of the fibre (b) that of the atmosphere coming in contact with the fibre and (c) the physico-chemical effects resulting from the sorption process. In order, the book includes the following (a) water and the atmosphere; (b) structure of fibres; (c) sorption isotherms; (d) heat of absorption; (e) two- or three-phase absorption theories; (f) theories of multi-layer adsorption; (g) rate of change of moisture content; (h) simultaneous diffusion of heat and moisture; (i) diffusion in fibre-forming substances; (j) moisture and electrical properties; (k) effect of moisture on density and optical properties; (1) effect of moisture on mechanical properties; (m) fibres and liquid water. Well illustrated and with extensive references to other publications, the book is very carefully indexed. Embracing both natural and man-made fibres it will be of immense value to scientific textile workers and research, etc., organisations. It will not appeal to the majority of mill technical staff but advanced technologists will find it of considerable help in understanding many of the problems encountered in mill processes and fibre behaviour.

S.A.N.

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MANUAL OF MAN-MADE FIBRES. C. Z. Carroll-Porczynski. Astex Publishing Co., 22-23 North Street Guildford, Surrey. (price 29s. net).

A manual in every sense, this recent addition to textile literature deserves the widest possible circulation. Probably the only one of its type in existence, in just over 300 pages, it provides in a condensed but comprehensive manner a tremendous amount of valuable information on all organic and inorganic man-made fibres. In ten sections, *Part* 1 deals with world production and classification of fibres. *Part* 2 is concerned with natural polymer man-made fibres, regenerated cellulose, cellulose ester, regenerated protein, and miscellaneous natural polymer man-made fibres. *Part* 3—the largest section—is devoted to synthetic polymer fibres (polyamide, polyester, acrylic, modacrylic; nitril and nitril alloy fibres; polyvinylidene, polyvinyl chloride, and polyvinyl alcohol fibres; polyethylene, polypropylene; fluorcarbon and polyurethane fibres. *Part* 4—inorganic fibres—includes glass; mineral wools; ceramic, silica and miscellaneous refractory fibres; metallic fibres and yarns. *Parts* 5 *and* 6—textured yarns—gives definitions, classification, trade marks and crimping techniques, also the identification and solubilities of fibres. *Parts* 7 *and* 8 are similarly valuable sections including 120 photomicrographs *and* X-ray diffraction photographs. *Part* 9 undoubtedly the most detailed bibliography to appear in a textile book—lists all the most important literature connected with man-made fibres. *Part* 10 gives world producers of man-made fibres and concludes with an excellent index. Well printed and attractively bound, the line work (flowsheets and stress-strain) diagrams have been clearly and beautifully drawn. No library should be without this volume and the price puts it well within the reach of every student. It is a notable work.

Roberti

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MECHANICS FOR TEXTILE STUDENTS. W. A. Hanton, M.Sc. (Tech). Textile Institute, and Butterworths Publications, 4 and 5 Bell Yard, London, W.C.2 (price 30s.).

When it was first printed in 1954, this valuable book immediately filled the serious gap in this specialised section of textile technology and this second edition—by photolitho—more than proves its value as the best medium in this field. Arranged in three sections, Part 1 is concerned with the study of movement (a) movement of machine parts (rotary movement); (b) linear, reciprocating and oscillating movement; (c) equations of movement. Part 2 of eight chapters, deals with (a) force, mass and momentum; (b) work and power; (c) composition and resolution of forces; (d) principle of movements; (e) friction; (f) coil friction; (g) machines; (h) stress, strain and elasticity. In part 3, seven chapters are devoted to (a) momentum and energy; (b) impulsive forces (impact); (c) motion in a circle (centripetal and centrifugal force); (d) velocity, acceleration and accelerating force diagrams; (e) simple harmonic motion; (f) moments of inertia (kinetic energy of rotating bodies); (g) experimental methods of finding moments of inertia. Admirably indexed, the book also includes an appendix setting out a selection of some useful formulae. Past students over many years remember with gratitude the author's clear teaching and this latest work will enhance still further his reputation with all present and future students. The questions, explanations and answers cannot be presented better.

S.A.N.

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MAN-MADE TEXTILE ENCYCLOPEDIA. Edited by J. J. Press. Textile Book Publishers Inc., a division of Interscience Publishers Inc., 250 Fifth Avenue, New York 1, New York, U.S.A. (price £10).

The combined work of a distinguished panel of 149 contributors and experts from a wide field of interests and activities, this book of over 900 pages has several unusual features all helping to further its value as a reliable, modern reference work. As might be expected the compilation and arrangements depart considerably from those usually found in the orthodox types of text-book. In all, twenty-eight chapters cover an enormous field and, in reading through it, one cannot help thinking that no single publication has ever contained so much information concerning one section of the entire textile industry. The first four chapters deal with raw materials, fibre manufacturing processes, fibre characteristics and identification. The fifth chapter—edited by the former editor of a well-known American textile journal—is concerned with staple, tow and yarn processing. Chapters 6 and 7 are devoted to sewing threads, rope, cordage and twine. The largest chapter (8) of nearly one hundred pages treats extensively the subject of woven and industrial textiles, split up into (*a*) weaving equipment developments, (*b*) industrial fabrics, (*c*) military textiles and (*d*) apparel end-uses. The next three chapters cover tufted materials, knitted textiles, lace and nets, and two subsequent chapters deal with non-woven materials and textile engineering principles. Dyeing, printing and flock printing cover the next two sections, with finishing and performance standards occupying two more chapters. Chapters 18, 19 and 20 give the techniques of apparel manufacturing, general principles of apparel and allied processing, renovation of man-made textiles, and the marketing of man-made fibres and fabrics. Additional valuable information is included in an economic and statistical section. World fibre trade-marks, an excellent glossary, and a very efficient index complete a monumental book. The editors and contributors have excelled in this fine job of work. Committed to this vast coverage, it has been no easy matter to decide what had to be included and where to draw the line. Well printed, bound and illustrated, it is easy to read and yet find no "dressing-up" of any subject, also an entire absence of ill-formed opinion. Factual to an exceptional degree, it is a distinctive addition to the literature on man-made fibres.

A.D.

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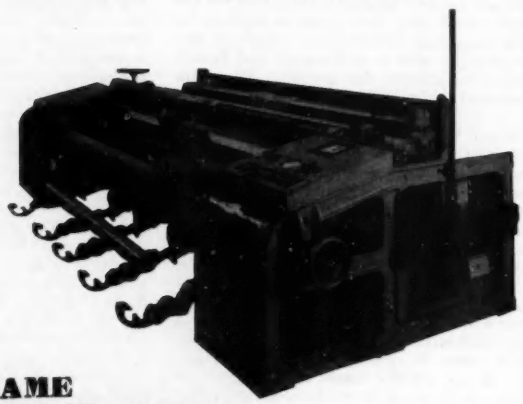
AIR OPERATED RECEIVERS. B/21, a new catalogue released by Negretti and Zambra Ltd., 122 Regent Street, W.1., describes with illustrations some of their circular dial and edgewise type receiving indicators, also disc and roll chart types. Proportional models include single pen and duplex recording controllers, on-line and compound action controllers, etc.

BOUCHER MACHINERY for the CARPET INDUSTRY

HYDRAULIC BEAMER

Lockheed Hydraulics enable constant pressure to be applied to beam rollers, from nothing to 1,000 lbs. per square inch, each side controlled independently. Constant Peripheral Beaming Speed throughout entire range of beam, from 6" diam. barrel to 36" diam. flange, at three different speeds. Totally enclosed oil immersed Constant Speed H-Gear Unit. Warp Length guaranteed. Machine automatically cuts out at any pre-set yardage for any number of beams, until re-set.



Tube frame threaded with the spool in its spring holders: eliminates four operations (patents pending). Needles are brought forward by simple foot operated switch, leaving operatives' hands free to attend to interrupted ends and return to thread by the same operation. Tube frames can be threaded as fast as removed from the chain, thus facilitating immediate return to their last position in the chain. All needles have rounded crochet hook ends, preventing yarn damage and enabling smoother threading. All spool end strive difficulties overcome enabling, 100W threading even if strive is as much as 1" by our new full length comb. By fitting side supports the standard 4/4 machine can thread 2/4 to 16/4 Tube frames, or a machine can be supplied 12/4 in width. Tube Frame automatically clamped eliminating still a further hand operation.

TUBE FRAME THREADING MACHINE

Easier to use than a type-writer! Operator can be trained within an hour. Quick and simple method of colour selection only 1½ inches from the design paper. Automatically stops when card is cut, automatic numbering device, centralised lubrication system, high cutting speed and rapid conversion to other card sizes. Operator fatigue reduced to a minimum for the machine takes care of the Brainwork.

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Trade Literature

"WHAT WE MAKE". A new leaflet No. V59(2) is the second of a series produced for the Gas Atmospheres Division of Incandescent Heat Co. Ltd., Cornwall Road, Smethwick, Birmingham. It deals briefly with bog ore boxes, burners, butane burners, butane scrubbing and storage vessels, burnt gas processing equipment and by-product gas burners.

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DATA ON ALGINATES. A recent loose-leaf folder released by Alginate Industries Ltd., Walter House, Bedford Street, Strand, London, W.C.2, gives detailed specifications of the company's range of products grouped as a series of product data sheets. Each one sets out the essential details of certain products, together with other useful information and brief notes on their most suitable applications. To illustrate the range of viscosity characteristics obtainable, a graph showing the viscosity/concentration curves for a selection of these products is also included.

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TEXTILE PRINTING. A new "slim-line" booklet, "Brotasul"—Calcium Formaldehyde Sulphoxylate, from Associated Chemical Companies (Sales) Ltd., P.O. Box No. 6, Brotherton House, Westgate, Leeds 1. It is a reprint of a recent lecture by Mr. R. J. Hannay in which a description is given of investigations aimed at producing increased stability of prints containing sulphoxylate formaldehyde reducing agents and avoidance of "haloing" and "wicking" in producing discharge prints on protein fibres and man-made fibres.

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RUBBER PRODUCTS FOR TEXTILE MACHINERY. Natural and synthetic rubber products specifically for the textile industry are dealt with in a new catalogue by Dayton Rubber Co., Textile Division, Dayton, Ohio, U.S.A. Different aspects of research and testing are shown, followed by a complete list of roller cots for cotton, woollen and worsted, etc., mills, also single and double high draft aprons, rub aprons, condenser tapes, slasher rollers, etc. Weaving accessories include pickers for underpick and overpick looms, check-straps, lug straps, and strap couplings, sweep-sticks, picker buffers, spindle buffers and washers, harness straps, stripper blades, take-up roller coverings, frog buffers, etc.

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CARPET, ETC., BACKING COMPOUNDS. Laboratory report No. LQ1/1, released by Monsanto Chemicals Ltd., Monsanto House, 10-18 Victoria Street, London, S.W.1, concerns Latex SB2 for tufted carpet and fabric backing. It is a 60/40 styrene-butadiene co-polymer with a solids content of approximately 48%, characteristics which are claimed to give it the best combination of physical properties for the purpose. Typical formulations are given for tufted carpets, also advice on the equipment required, recommended rates of application and drying, etc., procedures. Backing compounds for woven carpets, tufted fabrics, moquettes and similar pile fabrics are also given.

INDUSTRIAL ELECTRONIC EQUIPMENT. With a background of more than twenty-five years' research and development in electronic control systems, the A.E.I. Electronic Apparatus Division with headquarters at New Parks, Leicester, is highly experienced in advising manufacturers of the benefits offered by modern techniques. A brief synopsis of what has been achieved, is given in a profusely illustrated publication (4051-81, Ed. A), issued, by A.E.I. (Rugby) Advertising Department. The publication imparts an insight into what can be accomplished to reduce costs and increase efficiency in many industrial processes, and includes sections on electronic motor control, power magnestats, static switching, welding controls, voltage regulators, electronic timers, high frequency heating, photo-electric equipment, control of paper machine drives, crane approach warning system, "Clearcall" carrier-frequency communication system, safety devices, etc. Copies can be obtained from the Advertising Department, A.E.I. (Rugby) Ltd., Mill Road, Rugby.

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PROTECTION AGAINST CORROSION. A three-colour folder from Wareing Bros. and Co. Ltd., Carlton Street Works, Bolton, Lancs., gives full information and directions for use of "Blackpete" bituminous paint. Supplied ready for immediate use, it brushes easily and dries hard in three to four hours to a continuous resilient film. Excellent for all types of structural iron steelwork, tanks, downspouts, gutters, sheds and garages, bridges, etc., it is recommended for treating damp walls and as a damp-proof course over concrete floors.

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FLAME PROTECTION. Stated to positively discriminate between flame and hot refractory, the Purple Peeper, developed and marketed by Honeywell Controls Ltd., Greenford, Middlesex, is described and illustrated in a novel folder. Pointing out that it is ultra-safe, the company cite the following points: (*a*) senses only ultra-violet radiation, (*b*) does not respond to simulated flame conditions, (*c*) stops fuel delivery instantly on flame failure, (*d*) provides flame protection with any type of fuel and (*e*) protection for the most difficult applications, such as exothermic gas generators.

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METALEXICON. Attractively produced with varnished covers and finely illustrated, this new publication is, in effect, a concise guide and dictionary of the range of developments produced and marketed by Metalastick Ltd., Evington Valley Road, Leicester. The company has built up a high reputation in the application of rubber to problems of vibration, shock, misalignment, unlubricated movements and suspension. Eighty-three two-colour illustrations show details of many of the firm's specialities and in twenty-four pages the brief descriptions have been alphabetically arranged to facilitate efficient and rapid reference.

NEW ENTERTAINMENT FILMS CATALOGUE —G. B. Film Library, Aintree Road, Perivale, Middlesex, (price 2s. 6d. post free). The new catalogue of 16 mm. entertainment films—the 1960/61 edition—lists more than 1400 feature films and shorts, and the 140 pages include over 150 illustrations. With a striking front cover, glazed so that it can take any amount of handling without damage, the catalogue is likely to be referred to by all who use 16 mm. entertainment films. The contents include no less than 35 new full length feature films. The catalogue provides easy reference to all films by the simplified index, which divides the films into subject headings. No effort has been spared to simplify the selection of programmes — even the "shorts" are sub-divided into different categories.

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RURAL INDUSTRIES. Trustees of the Rural Industries Bureau, 35 Clamp Road, Wimbledon Common, London. The annual report covering April 1959 to March 1960 says that, in general, it was a year of good trading for most rural industries. Information is given on woodworking, clay industries, saddlery, thatching, willow processing and basketry, and work done in the Welsh woollen industry in designing fabrics and giving advice on machinery and training of young employees.

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REHEATING FURNACES. The conditions of reheating furnaces need to be closely controlled and in a recent publication (No. 2023) George Kent Ltd., Luton, give details of (*a*) automatic control system for a small single-zone furnace, (*b*) an alternative system, (*c*) automatic control system for multi-tone furnaces, (*d*) recuperator system. The last section is concerned with safety requirements.

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"TERYLENE" INDUSTRIAL BUYERS' GUIDE. Now available, this latest buying guide from I.C.I. Ltd., Imperial Chemical House, Millbank, London, S.W1., has been completely revised and issued in seven sections. Part 1: Reinforced Rubber and Plastics. Part 2: Canvas Covers, Coated and Proofed. Part 3: Threads, Braids, Webbing and Tapes. Part 4: Industrial Fabrics. Part 5: Marine Applications. Part 6: Electrical and Miscellaneous Products. Part 7: Manufacturers of "Terylene" Overalls and Protective Clothing.

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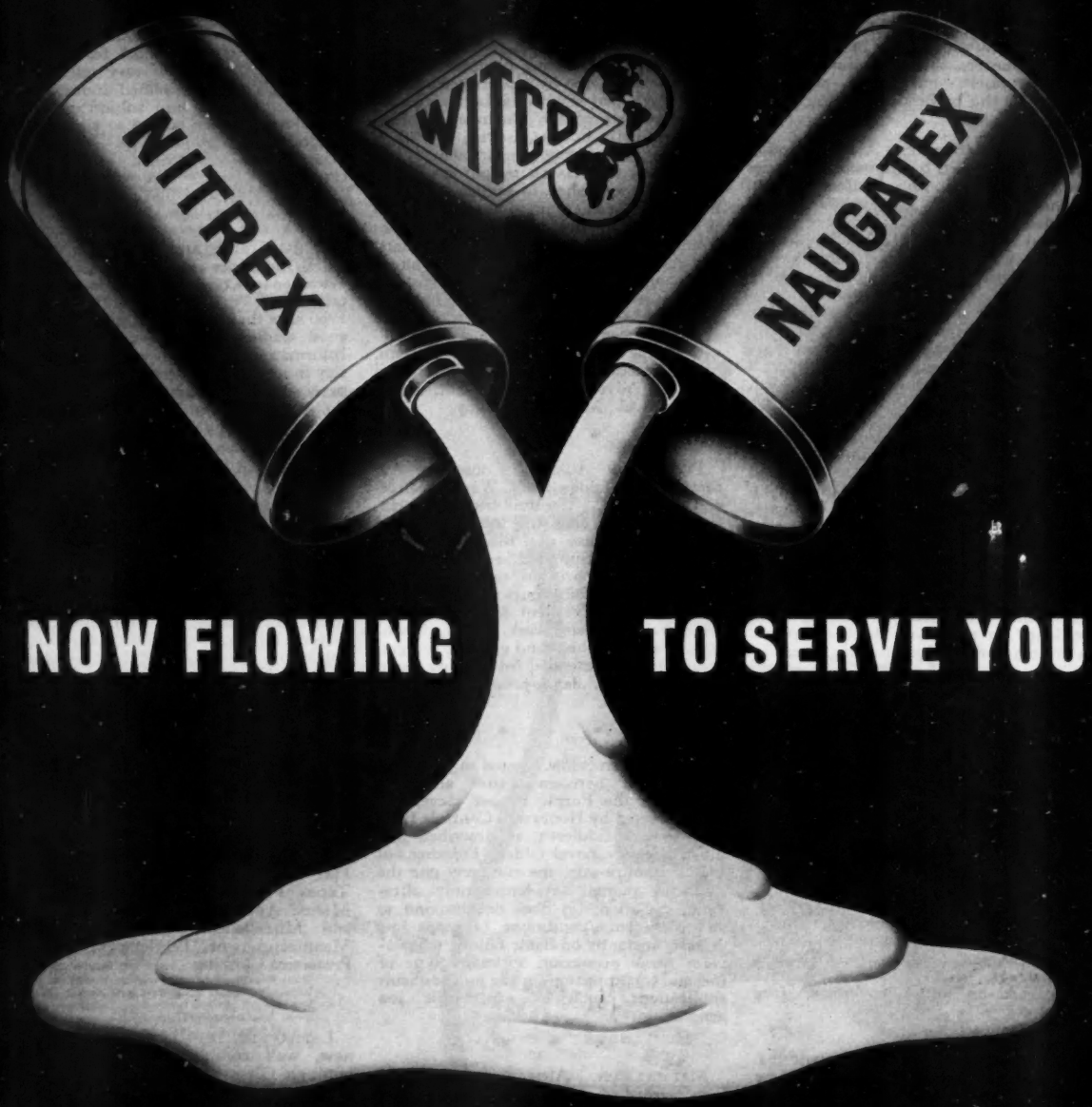
LABORATORY, ETC., EQUIPMENT. In a new, well compiled catalogue Loughborough Glass Co. Ltd., Loughborough, devote the first section to their growing list of specialities including P.T.F.E. sleeves, Oldershaw columns, water stills, water-deionisers, nitrogen digestion apparatus, micro-combustion apparatus, organic semi-micro apparatus, vacuum gauge, beaker tongs and stopcocks, etc. The main body of this extremely useful publication remains in convenient alphabetical order and within the following three sections (a) interchangeable laboratory glassware (b) plastics laboratory equipment and (c) general laboratory equipment Almost every item is illustrated with details and prices.

SYNTHETIC LATICES



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Textile Trade and Prospects

Capacity and Demand Paradox in Lancs.

According to the U.S. Dept. of Agriculture, the supply of cotton in the U.S. during the 1960-61 marketing year is estimated at about 22·2 million bales, or approximately 1·4 million bales smaller than the previous year. A smaller starting carry-over is said to be the cause of the decline. The 1960 carry-over is 1·3 million bales less than a year earlier, and the 1960 crop is expected to be about the same size as that of 1959, around 14·5 million running bales. The carry-over on August 1, 1961 is not expected to be greatly different from the preliminary figure for 1960, about 7·6 million bales. Estimated disappearance of approximately 14·5 million bales in the 1960-61 marketing year will probably balance the 1960 crop. Exports during the current season are expected to be around 6 million bales, compared with 7·2 million during 1959-60. Domestic mill consumption of cotton in 1960-61 may be as much as 500,000 bales smaller than the 9 million consumed in 1959-60. The quality of the 1960 carry-over is reported to be good and the average staple length of 1 $\frac{1}{32}$ ins. for American upland cotton is stated to be the longest since 1951. Strict Middling and higher grades accounted for the highest proportion of stocks since 1948 and Middling and equivalent grades accounted for the highest proportion since 1939.

In trading circles demand for yarn and cloth has been fully maintained. Turnover has been extremely good although one or two buyers have displayed signs of hesitancy with some ruling prices; rises of a 1d. to 2½d. per lb. were noted in American-type yarns and advances of up to 4½ were asked for certain Egyptian-type yarns. Delivery dates have now lengthened to an alarming extent and the overall situation can hardly be termed satisfactory in view of the labour position and the general resistance to shift working. It is ironical to think that the machinery that has been scrapped could have dealt with present requirements quite easily but before it was broken-up demand was pathetic. It is a bitter reflection on our efforts to bring a factual, practical point of view to bear on this question of relating capacity to *real* demand when one knows that any threat of shortages immediately results in a frenzied spurt of buying activity.

Practically every count and quality of yarn has been sought during the month. There was a little more interest from a few overseas customers but the bulk of sales were on home trade account. Most of the business negotiated was for standard weaving qualities on cop, cone and ring beams. Coarse numbers have been well supported and all the available condenser types are eagerly snapped up. Fine combed mule-spun qualities are now selling better and a limited degree of shift-working has helped to alleviate the position slightly. Blended specialities, novelty folded and core yarns are in considerable demand.

The position in weaving is somewhat similar with supply hardly able to cope with demand. Home interest alone is more than sufficient but renewed enquiry from some markets in the Far East and the Commonwealth has further aggravated the delivery position. Indeed, there is a grave danger that the eager help of foreign spinners and manufacturers may be sought. Time and price matter far more than sympathy and sentiment in modern business. A wide range of dress goods have been dealt in, including medium priced woven and printed cloths. Shirting sales have covered the whole range from the cheap printed types to the most expensive poplins and blended cloths. Furnishing fabrics in every design and price bracket have been sought. Interest has been roughly divided between traditional and contemporary designs in dobby and jacquard woven cloths, and in machine and screen printed patterns. The same tempo of activity has characterised the turnover in household textiles. Plain and colour-woven cotton blankets are in good demand. Cotton sheetings and blended sheetings are selling well, and the interest in alhambra-type quilts is a little better. Terry-type bedspreads are in excellent demand but some retail prices kill rather than stimulate public support for these novelties. It is a great pity that such an important industry strings along in such a haphazard fashion.

Wool Production and Consumption

World wool production in the 1960-61 season will be about 5,560 million lb. (greasy basis), or 1% less than last season's revised total of 5,615 million lb., according to Commonwealth Economic Committee estimates. This slight fall in world production is almost entirely due to expected reductions in the Australian and South African clips of around 5 and 7% respectively. New Zealand's output, however, will probably reach a new record and the South American position shows a marked recovery after last year's floods. Information from the Communist group of countries is limited, but it is known that bad weather in some important producing areas reduced sheep populations last winter. Only a marginal increase in wool output by the Sino-Soviet bloc is envisaged for the coming season. The whole of the world reduction is in merino type wool, which is expected to fall by 3% compared with 1959-60.

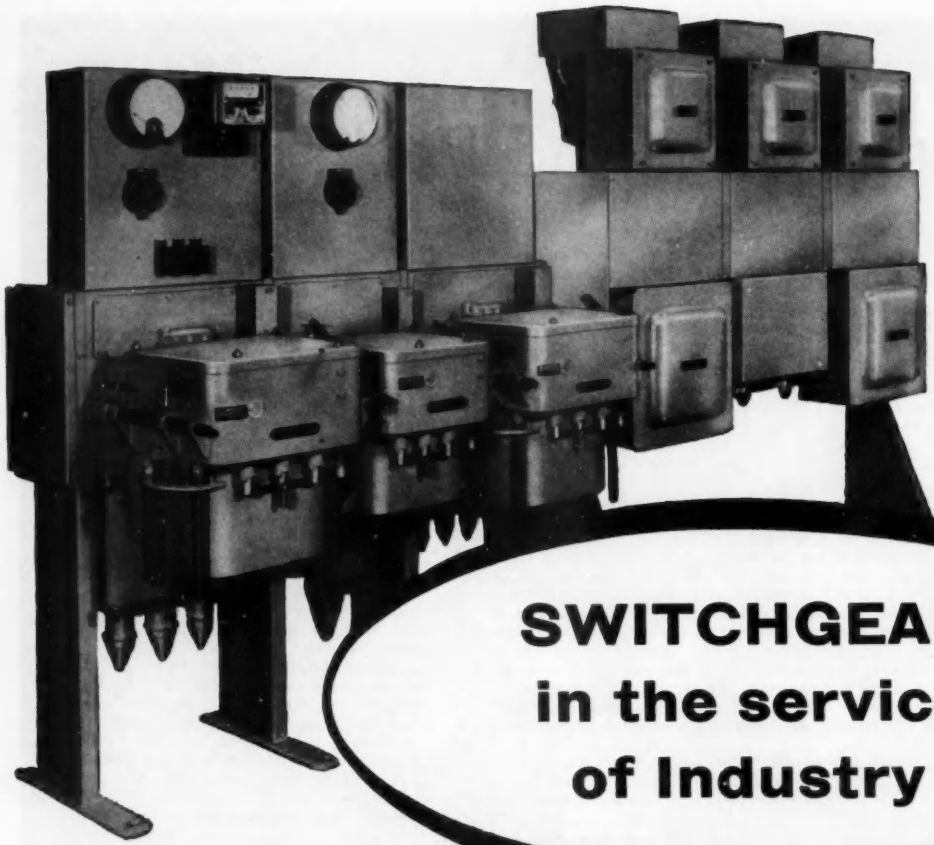
U.K. wool stocks at July 31st were 234·2 million lbs. (clean), an increase of 13 million lbs. compared with a month earlier, reports the Wool Industry Bureau of Statistics. This increase was chiefly due to a seasonally large intake of domestic wool by the British Wool Marketing Board. August holidays make comparisons difficult in the most recent figures issued by the Wool Industry Bureau of Statistics, and the Bureau therefore surveys the two months of July and August. When this is done, wool consumption in the U.K. over the two months is seen to be 7% lower than in July/August 1959. In top production it was 10%, but wool usage in woollen spinning was only fractionally below the rate a year earlier. On the other hand, the rate of delivery in worsted yarn for the two months was 5% higher than a year ago, and wool fabric deliveries were also slightly higher. Output figures for the month of August were: Wool consumption, 29·83 million lbs. (clean); top production, 17·58 million lbs.; tops drawn, 14·70 million lbs.; worsted yarn delivered, 16·26 million lbs.; woven fabrics delivered, 24·45 million sq. yds.; blankets delivered, 2·48 million sq. yds. The Soviet Union is to import from the U.K. woollen piece goods, carpets, knitwear and clothing valued at £1,106,000 during the period ending June 30th, 1961. These purchases under last year's Anglo-Soviet Trade Agreement are:- Woollen piece goods £425,000; handmade carpets £231,000; woollen knitwear £250,000; machine-made carpets £110,000 and made-up clothing £90,000. All values include cost, insurance and freight.

France has made further modifications in her wool cloth import regulations, states the National Wool Textile Export Corporation. Last January, the French authorities "liberalised" most of the wool cloth and blankets on which import restrictions had been maintained. These were mixture fabrics with wool or hair as the dominant fibre, but with these materials accounting for less than 85% of the total weight. Restrictions remained on mixture fabrics in which wool was the dominant fibre but which contained more than 15% by weight of discontinuous artificial fibre. This latter, as defined under the French tariff, includes rayon, but excludes fibres such as nylon and the acrylic and polyester types. The Corporation is now informed that all cloth imported under the French wool textile tariff has been liberalised, though blankets containing more than 15% by weight of discontinuous artificial fibres remain subject to import control. It is understood that import licences for these mixture blankets will continue to be issued in France.

Linen Trade Review

Uncertainty regarding raw material supplies during the 1960/61 season dominates activities throughout the industry, and even at this late date reliable information regarding the prospects is not forthcoming. While this has been due in measure to delay in harvesting and post-harvesting operations, resulting from adverse weather conditions and consequent difficulty in assessing the extent of crop damage, it could be largely avoided by closer collaboration between producer and grower. Each is dependent on the other and the long term interests of neither will be served by a "beggar my neighbour" policy.

Scotch mills have begun production with a smaller stock of retted straw than usual, so that the overall supply position during



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This picture shows an AEI switch and distribution board for industrial use, combining Types K and MC switchgear. Robust, versatile *Type K* units can be lined up easily with larger or smaller units. *Type MC* switchboards can be extended on site from stock components, without any limit to the number of circuits.

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the winter months gives some cause for anxiety, unless it can be relieved by an early resumption of retting next year. While in some areas in West Europe the crop suffered considerable weather damage straw losses were comparatively small and the total yield—when available—is expected to approach that of last season. In the circumstances processors are likely to prolong their deliveries, which will be small in bulk, and in the early stages will almost certainly include a high percentage of low grade fibre. With white flower strains now representing the bulk of the crop spinners of high class yarns are likely to experience considerable difficulty in obtaining their requirements.

While the raw material supply position gives little hope of any easement in prices—everything points in the opposite direction—during the coming months, spinners are meeting stiff resistance to any attempt to pass the increased cost on to their customers, and consequently have had to absorb this in their profit margins. The consumer is the final arbiter of costs, and both raw material and labour costs must be related to his assessment of end product value if the industry is to retain its position in world markets.

Manufacturers and merchants report a satisfactory flow of inquiries from home and overseas sources, and many are accepting business in absence of raw material and yarn cover. Spindles and looms are working to capacity with coverage extending well into the new year. Demand is fairly uniformly distributed over the whole range of output. Household linens are finding a ready market, and at the opposite ends of the range of linen textiles cambric and canvas manufacturers are hard put to keep abreast of commitments.

In the circumstances the strike of weavers in Lurgan linen factories has been timed to hold up deliveries for the important Christmas trade, with conseqeunces that may well boomerang on themselves. The strike is in protest against a 12½% warp stop deduction, which has been in operation for some time. The employers have stated that no change can be made in existing rates without sanction of the Power Loom Manufacturers' Association.

A statistical analysis of exports, just issued by the N. Ireland Ministry of Commerce states that total export orders for textiles during 1959 were valued at £13,608,000 compared with £11,043,000 in the previous year. During the second quarter of 1960 these totalled £3,436,000 comprising £2,624,000 for linen and union; £517,000 for cotton; £192,000 spun rayon; £41,000 cotton/rayon damask; £11,000 filament rayon, and £51,000 other descriptions. The figures indicate that the increasing diversification in textile production has offset the decline in linen manufacture.

Jute Prospects and Values

The raw jute market has become much dearer due to demand being in excess of supply and a fear that a shortage might develop later. The East Pakistan crop was about a month late being harvested and stocks of raw material held by many consuming countries were low. This brought out a fairly large demand for raw jute before the full weight of the crop was available, hence the sudden rise in prices. Pakistani mills, also short of jute, have been buying steadily and this has prevented shippers accumulating stocks for shipment overseas. The fact that cultivators have sold a fair amount of jute at high prices puts them in a strong position early in the season. There are signs they are regulating the flow to Pakistan markets to prevent the bulk getting into the hands of the middlemen.

During September most grades of raw jute were raised by about £15 per ton and offers were not freely made. The position became irregular with a wide range of prices being quoted. Higher grades of both white and dark jute were nominal in the absence of offers. Although Continental spinners followed the rise in values only a small business took place to Dundee as spinners were holding fair stocks of raw material. Mill Firsts were lowest at £139, Mill Lightnings at £130, Mill Hearts at £127 and grade Hearts at £125, c.i.f. U.K., for Oct./Nov. shipment but some shippers were asking up to £4 per ton more while others remained out of the market. Grade Tossa-2/3 was at £128, grade Tossa-4 at £130 and Continental Tossa-2/3 at £127, Oct./Nov. Offers of cuttings became scarce due to Indian mills securing large quantities during the first two months of the season. S.N.C. were named at £81 and N.C. at £71 for current shipment.

The future trend of the raw jute market is obscure. If cultivators can regulate supplies to prevent a surplus accumulating prices will remain high, but if demand falls off during the next two months and becomes less than the available quantities, prices should return to a more realistic level. The Pakistan authorities have now issued f.o.b. prices both for minimum export rates and for e.p.c. values. As offers are always made on a c.i.f. basis these official rates have to be converted by the addition of freight and insurance charges. In the case of long jute the freight amounts to £10 15s. per ton but the insurance is on a sliding scale depending on the value of the grade in question. Although prices of raw jute in Pakistan have advanced considerably there has been no marked increase in values of Calcutta goods. Due to a possible shortage at the beginning of the season a voluntary scheme was brought into force on June 6th whereby members of the Indian Jute Mills Association were permitted to reduce production to conserve stocks of raw material until supplies from the next crop became available. It has now been announced that this scheme is to continue until the end of December.

Quotations are rather irregular but about lowest at 74s. 6d. for 10 oz. 40 in., and at 56s. 3d. for 7½ oz. per 100 yds. f.o.b. Calcutta for October and November shipment, at 74s. 3d. and 56s. December and at 74s. 3d. and 55s. Jan./Mar. B twills were at 209s. 9d., 204s. 9d., 203s. 3d., 203s. for the respective shipment periods. Due to the much dearer raw material position it was necessary to raise prices of yarns and cloth in the U.K. on two occasions during September. Prior to these increases a fair amount of business was placed but there was not very much interest shown in the forward delivery position. Consumers are reluctant to pay the present high prices and the business passing is mainly for current consumption. The heavy end of the trade is now again quieter after a fair business before values were raised. In general, producers are quite comfortably placed at present but more orders will be required before the end of the year to maintain output at the present level.

The Scottish flax trade is busy. Although new business does not amount to a great deal spinners and manufacturers are fully employed with previous orders. The raw material markets are firm and prices are inclined upwards. Offers of raw flax are not being freely made and prices are irregular.

Silk and Man-Made Fibres

Spinners' and manufacturers' order books are well filled, extending in some cases to summer 1961, but some staple spinners are inclined to be cautious and will not entertain bookings too far ahead. Some incline to the view that in twelve months from now the outlook may not be so bright and all unbalanced factors will have been eliminated accompanied by less accent on demand. The shirtings and dressgoods trades are still absorbing large weights of medium counts in cotton and blended specialities including all that is available of "Terylene"/cotton single and two-fold yarns.

Lancashire interest in both Tricel and secondary acetate cloths is very good just now. These and nylon dress cloths are in keen request, and in some of the heavier weights of nylon a pronounced shortage is reported at present.

Business remains at a high level in Macclesfield and Leek areas. Throwsters, are as now as active as ever and order books extremely well filled for silk yarns and bulked types. Fortunately there is no great concern at present on the question of yarn deliveries. Demand is fairly evenly spread over the Leek trade with most classes of narrow fabrics and specialities being sought. Sewing threads are in steady demand but one problem just now is the shortage of labour in the town. Margins continue competitive. In the Macclesfield area screen printers report rather more business, especially traditional styles for woven nylon, silk, cotton and rayon fabrics. Silk appears to have re-established itself and the demand extends well into the future.

In Yorkshire most classes of man-made filament and spun yarns are in steady request. Woollen fabrics tend to show that more use is being made of rayon in beautiful fabrics, and demand just now is at a high level. In the men's suiting trade, demand is very steady for cloths of "Acrilan"/wool and "Terylene"/wool, and a similar tone is noticeable in women's fabrics.

Midland manufacturers' express concern at the continued importation of many kinds of foreign knitted goods, especially from Italian sources, and the quality and styling of these is sufficient to ensure a good sale in this country.

Some British Wools Dearer

At the October sale of British wool in Bradford, when the Committee of London Wool Brokers, acting for the British Wool Marketing Board, offered at auction about 3,500,000 lbs. of domestic fleece, picks were firm and supers up to 2½% dearer than at the Leicester sale last month. Massams were firm, Radnors 2½% dearer, and Welsh wools up to 2½% dearer. Swaledales were also firm, but Lincolns and lustre wools declined by 2½ - 5%. Fine topmaking wools rose by 2½%, and halfbreds were 2½ - 5% dearer.

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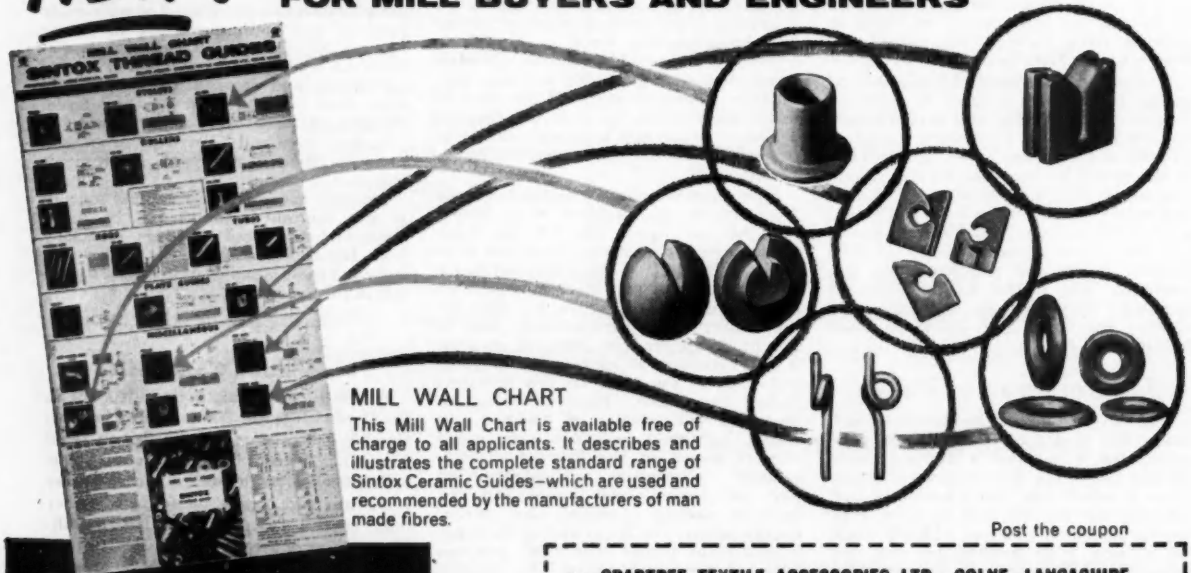

MILL WALL CHART

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Notes and News

More Research for N. Z. Wool

Establishment of an independent wool research organisation in New Zealand to carry out an expanding programme of research into the chemical and physical properties of New Zealand wool is awaiting Cabinet approval. It is recommended by the New Zealand Wool Board and the N.Z. Government's Department of Scientific and Industrial Research. Growers and the Government should contribute equally to the cost of the organisation, it is proposed, which will have an initial budget of £100,000. Currently the Wool Board spends about £30,000 a year on wool research in New Zealand and its commitment to the new project will mean a considerable increase in its research grants. Without waiting for Cabinet approval, the Board has already announced that it will grant scholarships immediately so that promising graduates who would form part of the staff could have three years' study in overseas universities. H. J. Wardell, chairman of the Board said, "An organisation such as this has been needed in New Zealand for a long time. Very little research on crossbred wool is done overseas, and it is important—if we are to maintain the competitive position of our major export—that we should have research on an adequate scale with co-ordinated and purposeful direction.

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Overseas Trainees in U.K. Industry

Do you know how big a part British industry already plays in helping overseas technologists to gain practical experience, or how much more needs doing? The answers to these and other questions appear in a booklet recently issued by the Federation of British Industries, 21 Tothill Street, London, S.W.1. In the foreword, Sir Norman Kipping (Director general, F.B.I.) writes—"The larger companies already provide much training. I believe the smaller companies, singly or in co-operation would do more than hitherto if they had greater knowledge of the need and of the problems involved. The object of this booklet is to provide them with that knowledge, and it sets out to do so by answering many of the questions industrialists will have in mind."

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Valuable Information Guide

It is said that a man's judgement is as good as his information and for the businessman who must be continually making decisions it is often a problem both to know what information is available and from where it may be obtained. The Manchester Public Libraries have recently published a guide to the Commercial Library which not only describes the different types of printed material available but also lists some of the more important bibliographical sources providing commercial and economic information. The Commercial Library itself takes a thousand current periodicals on trade, finance and economics; although it is manifestly impossible for any one person to read all these, there are various indexing and abstracting services described by which articles on particular subjects can be traced. Complementary to the periodicals collection, the Library maintains a clippings file arranged under some 800 separate headings. Other types of publications described include export services, directories, telegraphic codes, trade names, company information services, statistics, yearbooks maps, guides, timetables and government publications. Copies of the guide may be obtained free of charge from the City Librarian, Central Library, Manchester 2.

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Glycerine in Stain Remover

An aqueous detergent and stain-removing composition comprises one or more of the following: sodium carbonate, trisodium phosphate, metasilicates and polyphosphates, petroleum jelly, and/or balsam of Peru, a detergent, soap, fatty alcohol or fatty amide and ethanolamine and/or glycerine as a moisture absorbent. A pad of sponge polyethylene or tetrafluoroethylene may be impregnated with the composition. (Brit. Pat. 839,776).

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Wool Always Important

"I am sure wool is always going to be an important fibre," said Professor J. B. Speakman, head of the Department of Textile Industries at Leeds University, addressing a recent conference of wool textile apprentices in Bradford. He said that as a result of the research work of the past 40 years, a great deal was known about the unique structure of wool, and industry could now do much more with wool than was possible even ten years ago. Professor Speakman added, "I do not think it can ever be replaced by other fibres".

Germany Chief Buyer of S.A. Wool

German buyers were most active in the first two months of the new wool season in South Africa, taking 2·3 million lbs. of greasy and scoured wool between July 1 and August 31. The U.K. bought 1·3 million lbs. and France and Italy each 1·2 million lbs. Continuing her heavy buying of South African wool tops, China took 483,000 lbs. of tops, as compared with 288,000 lbs. by Belgium, the second biggest buyer.

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Pyrometer, etc. Sales and Service

Industrial Instrument Services Co., Pyrometer Instrument Manufacturers and suppliers, are the British agents for the sales and technical service of the Wheelco Instrument Division of the Barber-Colman Co., Rockford, Illinois, U.S.A. Their services include repair and reconditioning for all Wheelco pyrometer instruments, with a complete range of thermocouples to suit any type of instrument and application. They recently moved to larger premises in Elkington Street, Aston, Birmingham 6.

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Change of Address

The Cardiff office of George Ellison Ltd. has been transferred to, 306 Western Avenue, Llandaff, Cardiff.

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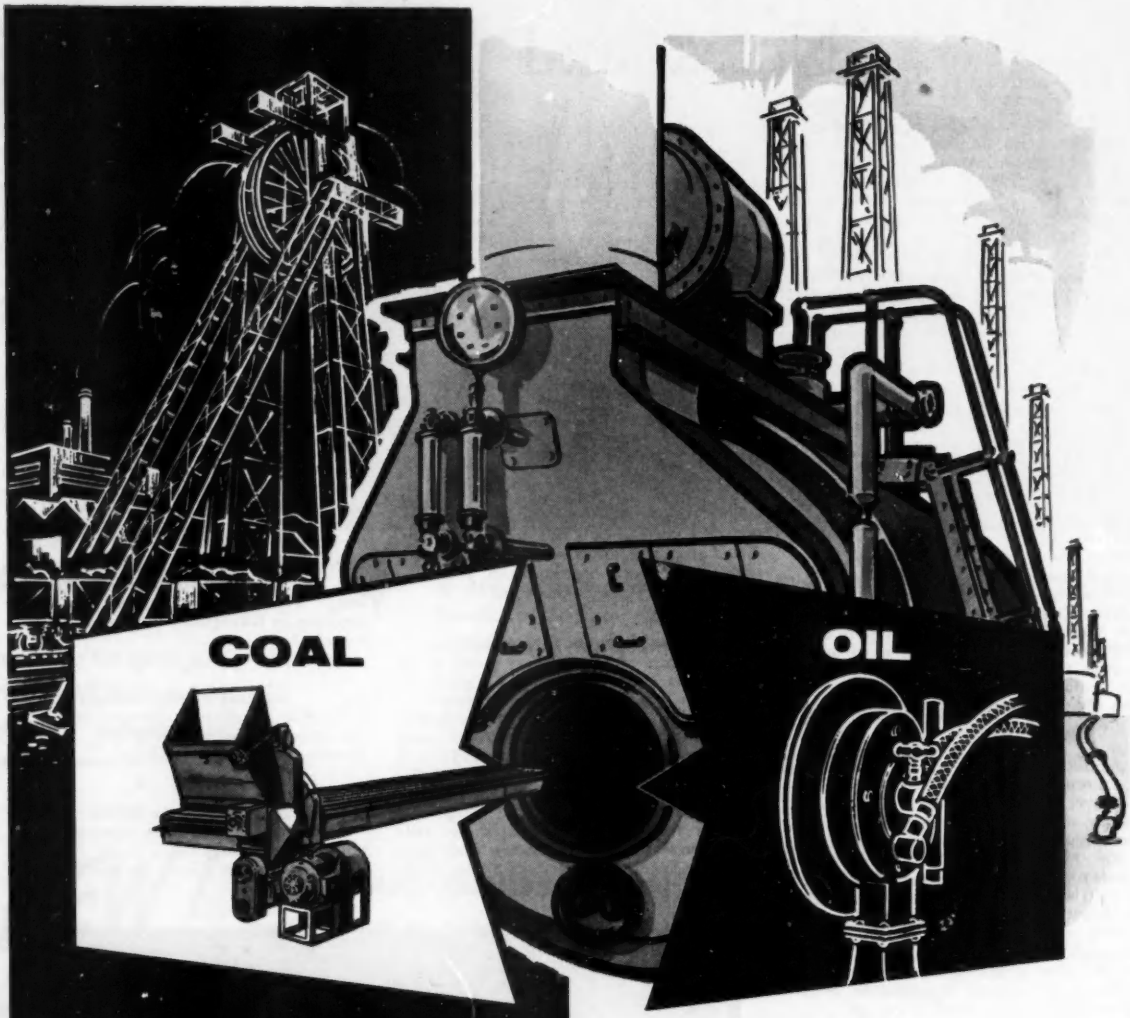
New Leicester Office

Chemstrand Ltd. have opened a new Midland area sales office at de Montfort House, Belgrave Gate, Leicester. Tel. 22018.

A "Terylene"/cotton conveyor belt, with special rubber covers compounded to resist sea air and water, running in a limestone quarry in the West Country. Made by Barrow, Hepburn and Gale Ltd., the belt is 950 ft. long, and was made endless on site. "Terylene" was chosen to provide a belt of extra strength, increased impact resistance, and flexibility, to work under arduous operating conditions



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Training in Wool Textiles

Seven courses of training for apprentices, young executives and others employed in the British wool textile industry, to take place before the end of the year, are announced by the Recruitment, Education, and Training Dept. of the Wool Textile Employers Council in Bradford. They include lectures for young executives engaged in buying, selling or in production; for managerial problems; for telephonists and receptionists; for overlookers and supervisers; and for designers and directors. Details are available from the Director, Recruitment, Education and Training Department, Wool (and Allied) Textile Employers' Council, 55 Wells Street, Bradford 1.

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New Polyurethane Rubber

Daltoflex 1S, a new polyurethane rubber specially designed by I.C.I. Dyestuffs Division for fabric coating by the spreading technique, is an important advance in the use of nylon and other synthetic fibres in rainwear fabrics, lightweight "tarpaulins" and similar coated fabrics. Supplied in the form of hard irregular pieces, it dissolves readily in solvents such as acetone, MEK, MEK/toluene and ethyl acetate/ethylene dichloride giving viscous solutions ideal for spreading. The non-volatile organic isocyanates, Suprasec K and Suprasec G, are incorporated to effect curing of the Daltoflex 1S (completed either by storage or a short heating), and the coatings are said to possess excellent adhesion and flexibility superior to those of earlier types of coatings on fabrics of the nylon type.

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Wool Demand in Australia

Intensified promotion has stimulated a greater demand for wool during the past 18 months in Australia, said the chairman of the Australian Wool Bureau, W. A. Gunn, reporting "spectacular increases" in wool yarn production in Australian mills in the first nine months of the 1959-60 season. Increases range from 22% on weaving yarn to 31% on worsted yarn, 34% on machine knitting yarn and 46% on hand knitting yarns. These increases, said Mr. Gunn, had been greeted by the trade as the "proven success of the Bureau's programme of force promotion." He added that the success of the campaign had not influenced the price of wool because local mills bought only 7½% of the clip, but the experiment in intensified promotion had shown what could be achieved.

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Colours for Spring and Summer 1961

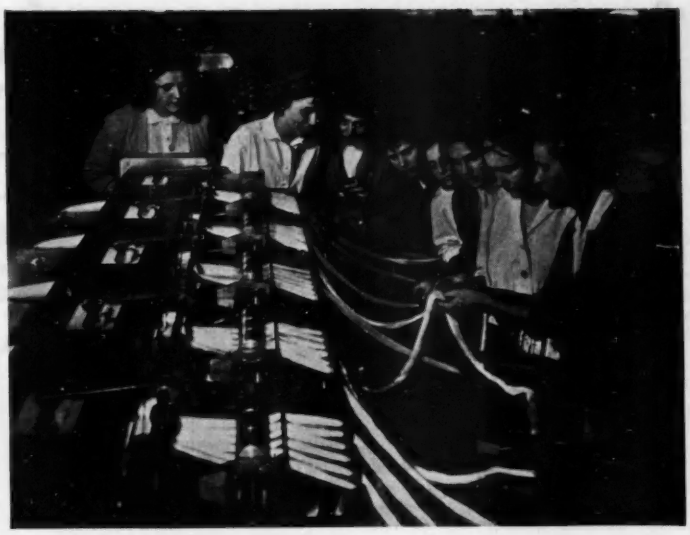
The British Colour Council's range for Spring and Summer 1961 shows 12 colours for knitwear, 32 colours for wool, 33 colours for silk and man-made fibres, 21 colours for cotton, 16 colours for leather, 6 colours for hosiery and 20 colours for millinery. Interesting colour trends running through the ranges include new greened-blues, blonde and brown tones expected to be important for next Spring, and an awakening interest in golds and corals deepening to terra cotta. Fondant colours, in the silk and man-made fibres range, include clear lime tones, lilacs and lavenders.

Greened-Blues:—Under "Halcyon Days are six greened-blues. The three softer toned ones called Wildflower blue, Majolica Blue and Blue Feather are on the wool range, and the deeper, greened-toned Zircon Blue, Navarone Blue and Blue Jay are on the silk and man-made fibres range. Continuing into the knitwear range are Cascade and Moontide, a paler and darker version, with the darkest of all, Chinese Turquoise, on the cotton card.

Blonde and Brown Tones:—Paler tones such as Rye Grass and Bisque are shown for wool while Pastel Peach, Caramel Blonde and Tanagra, a deep pinky-brown, are suggested for silk and man-made fibres. A similar warm pink-brown called Sere Brown, is given for knitwear and a cooler brown called Bulrush for cotton.

Golds, Corals, Terra Cottas, etc.:—These colour types are included on almost every range. Fanfare Gold, slighter than an old gold, is shown on satin in the silk and man-made fibres range, Sheer Gold, a clear yellow gold, on the wool range, and Gipsy Gold, a deep pollen yellow, on the cotton range. Coral tones include Sunset, a delicate orange, Coral, a pinky orange, and Nectarine, Azalea Orange and the more muted Poker Red on the cotton range.

Fondant Colours:—Six clear pastels, reminiscent of cream fondants, are shown. These include two lime-toned yellows, Limeflower and New Laurel, a pale turquoise called Sky Blue, a silver grey called Mystic Grey, and two pinks called Pink Clover and Rose Pink.



Hungary's first school for trainee girl spinners and weavers was opened recently at the Lorinci Spinnery, twenty-five miles north-east of Budapest. During the twelve months' course the girls are reported to get five months' theoretical instruction followed by practical training in the factory. In this photograph one of the instructors is showing new trainees the correct way to piece-up at the drawframe

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Monsanto and American Viscose Deal

Monsanto Chemical Co., of St. Louis and American Viscose Corp., of Philadelphia announce that negotiations are in progress for the acquisition by Monsanto of Viscose's entire interest in Chemstrand Corp., namely Viscose's 50% interest in both Chemstrand's stock and Chemstrand's sub-ordinated notes, estimated to amount to $9,500,000 at the time the plan would be consummated. Under the proposed plan, Viscose would receive 3,540,000 shares of Monsanto common stock which would be subject to special voting provisions so long as they are held by Viscose. The plan would be subject to approval by stockholders of both companies. After the proposed transaction is approved and effected, Chemstrand will continue its activities as a separate entity.

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Consultants' Link with Common Market

To develop trading opportunities with the European Common Market and to encourage closer exchange of industrial and management "know-how" between Britain and Europe, Production-Engineering Ltd., 12 Grosvenor Place, London, S.W.1., (management consultants) recently founded a new organisation in Paris, Production-Engineering Societe Anonyme, 3, Square de l'Opera, Paris IXeme, who have already carried out several assignments in France. Prominent among the specialised services is electronic data processing. A new booklet available from the London address, entitled "Into Europe" briefly surveys opportunities in the Common Market. It also contains a set of tables of economic trends in U.S.A., Britain and the Common Market area.

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New Process to Produce Non-Wovens

A new process for manufacturing non-woven fabrics on paper-making equipment has been announced by Du Pont de Nemours International, S.A., 81 Route de l'Aire, Geneva, Switzerland. Basic to the process are new synthetic fibrous particles developed by Du Pont. The company has also coined a name—fibrid—for the new fibrous form of synthetic polymeric material. Another generic word—textryl—has been coined to describe the non-woven structures which may be manufactured through use of fibrids. For the present, Du Pont will produce and sell fibrids only in experimental quantities. The new structures may be produced in a variety of weights and textures.

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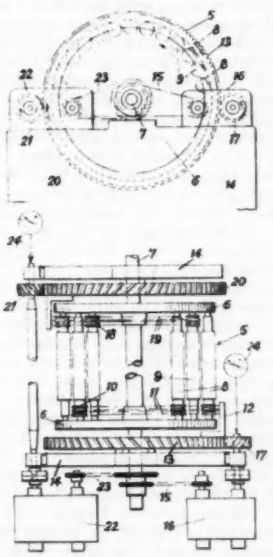
RECENT TEXTILE PATENTS

These abridgements are republished from specifications by permission of the Comptroller of H.M. Stationery Office. The full specifications can be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2. Price 3s. 6d. each (accompanied by remittance).

821,850 Raising Machines

TOMLINSONS (ROCHDALE) LTD., *Soho Works, Rochdale.*

A device to indicate the amount of raise imparted to fabric passing over the cylinder of a raising machine. The ends of the cylinder 5 are represented by two discs 6 fixed to a common shaft 7 which is rotated contra clockwise, the periphery of the cylinder being represented by an even number of rollers mounted upon the discs 6 for rotation about equally-spaced axes parallel to the axis of shaft 7. These rollers are covered with card clothing and certain of them (indicated at 8) have the card teeth pointing in their direction of rotation, whilst the remaining rollers 9 have their teeth oppositely directed. The front ends of rollers 8 are provided with pulleys 10 engaged by endless V-belts 11 which are connected to a lug 12 on a large gear-wheel 13 journalled upon the main structure 14 of the machine for rotation concentrically with shaft 7. The front end of the latter drives through a chain 15, an infinitely-variable gear box 16 whose output shaft is coupled to a pinion 17 in mesh with the gear wheel 13, both elements of this gear-



pair having 45 degrees helical teeth. The rear ends of rollers 9 have pulleys 18 driven through V-belts 19, a second helical gear-pair 20, 21 and a variable-speed gear box 22 which is chain-driven at 23 from the same end of shaft 7 as the gear box 16. In this way the two sets of rollers are rotated in a common direction which is opposite to that of the cylinder and also opposite to that in which a length of fabric (not shown) is fed. It will be evident that, if straight-out spur gears were used for driving the rollers 8, 9, there would be a radial thrust from the pinions 17, 21 on to the gear-wheels 13, 20 if the former are driving the rollers 8, 9 and conversely a thrust from the gear-wheels 13, 20 to the pinions 17, 21 if the rollers 8, 9 are tending to be driven by the fabric passing thereover. By employing helical gear-pairs with 45 degree teeth the radial thrust is converted into an axial thrust and the gear-elements which are being driven tend to ride along the teeth of the driving elements, the amount of such axial thrust being a measure of the amount of raise given to the fabric by the rollers and is capable of indication upon a sensitive measuring instrument such as a thrust meter or dial gauge. When the rollers tend to drive the fabric, the gear-wheel 13 (or 20) tends to ride axially in relation to the pinion 17 (or 21), and the latter rides axially upon the gear-wheel when the fabric tends to drive the rollers. In the condition of "zero raise," however, both gear-elements are balanced and have no tendency to axial movement. A thrust meter 24 driven from each pinion is arranged in such a manner that the condition of "zero raise" gives a zero reading, in the other two conditions, a reading is given and this reading is a measure of the force exerted between the points of the card clothing on the rollers and the cloth passing thereover. To obtain the "zero raise" condition it is merely necessary to adjust the variable-speed gearboxes 16, 22 until both meters 24 have their pointers at zero.

822,323 Softening Hard Fibres

R. H. TURNBULL, *The Royal Empire Society Northumberland Avenue, London, W.C.2.*

A process for the softening of sisal and hard vegetable fibres which have previously been separated from the other tissues of the plants. The process comprises treating the fibres with a liquor containing a cytase or cytases to effect a softening of the fibres, and then repeatedly rolling the fibres to effect a further softening.

822,352 Roller Setting Device

GEORGE ANGUS AND CO., LTD., *Angus House, 152—158 Westgate Road, Newcastle-upon-Tyne* 1.

Describes a contrivance by which correct roller setting for the drafting unit of a spinning machine, can be found for any roving without having to experiment on long lines of drafting rollers. The contrivance consists of a frame with cap nebs, adjustable on the frame, to take first, middle and third roller sets. Each roller set comprises a top drafting roller, a bottom roller and an idler roller to transmit drive to the bottom roller, to be mounted in place of normal cap nebs on one section of a drafting unit so that the bottom rollers of such section can drive the idler rollers. The apparatus is used by diverting rovings upwards and reeving them through the applied drafting rollers, and adjusting the distance apart of the first and middle roller sets, to suit the particular rovings. The distance apart of the cap nebs can then be measured and, the apparatus having been dismounted, the whole lines of the first and middle rollers of the drafting unit can then be adjusted to the measured distance apart.

822,357 Roller Clearer

CASABLANCAS HIGH DRAFT CO., LTD., *Bolton Street, Salford* 3.

A fibre roller drafting mechanism, has the combination with a roller stand, of an under-clearer end mounting including a bracket arm, which is pivoted to the stand and has an upward directed seating for supporting an under-clearer end pivot. A coil spring which interacts between the stand and bracket arm urges the seating portion of the latter in an upward angular direction so that an under-clearer, when similarly supported at each end, will be lightly pressed into frictional contact with a bottom drafting roller.

822,371 Spring-Loaded Loom Buffer

METAPIC S.A., HOLDING LUXEMBOURGEOISE, 144 *Rue de Hollerich, Luxemburg, Luxemburg.*

A shuttle stop-motion for looms, comprises a hollow body, with stop elements located in the front and back face of the body and mounted on a common spindle, Within the body is a spring bearing at each end as well as on the corresponding stop element.

822,520 Yarn Clearer

WANNER A.G., *Horgen, Zurich, Switzerland.*

A yarn clearer for multiple spooling machines, winding machines etc., comprises two plates each having at the face towards the running-in of the yarn, an inclined surface which externally of the plates, forms an obtuse angle with the path of travel of the yarn. The plates are provided with a dust groove which is parallel to the normal path of the yarn and on the inner side of at least one of the plates there is provided a knot deviation channel. This channel starts at a point of the inclined surface above the dust groove, and in the direction of travel of the yarn slopes downwards to terminate in the groove at a point lying below the normal path of the yarn.

822,590 Pick and Pick Automatic Loom

CROMPTON AND KNOWLES CORPORATION, 93 *Grand Street, Worcester* 1, *Massachusetts, U.S.A.*

A weft replenishing loom has a reserve bobbin transfer station which includes a single shuttle box shiftable below the station, and a sub-gang of at least two shuttle boxes seperate from the single box and shiftable under the single shuttle box. Box shifting mechanism is effective on non-replenishing beats of the loom to shift the single box and the subgang as a unit so as to

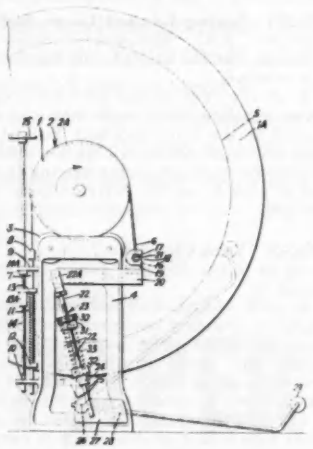
place each of the boxes, one at a time, in active shuttle receiving positions. Means are operative on a weft replenishing beat of the loom, and dependent upon depletion of weft in a shuttle in the single box when the latter is in active position, to raise the single box away from the sub-gang to the transfer station so as to leave a space below the box and above the sub-gang for egress of a depleted bobbin from the single box.

822,601 Controlling Warp Let-Off on Jute Looms

JUTE INDUSTRIES LTD., *Meadow Place Buildings, Dundee.*

An improved device on a loom for minimising jerky drag action of the braking device on the warp beam as the beam empties.

A brake for the beam 1 consists of a pair of drums 2 formed one at each end with peripheral grooves 2A on the beam, and the latter is mounted on end pairs of rollers 3 carried by brackets 4. Drag bands 6 engage in the grooves to brake the beam as the warp 5 is drawn from it. Each band has its end attached to an adjustable, spring assembly consisting of a rod 7 to the top of which the band is secured at 8 and which is slidable in lugs 9, 10, a compression spring 11 surrounding the rod, and whose lower end engages a collar fixed on the rod, a lug 13 slidable on the rod, and engaging the top of the spring, and a screwed rod 14 mounted in the lugs with a hand-wheel 15 on its upper end. The rod 14 engages a nut extension 13A on lug 13 so that rotation of



rod 14 effects movement of the lug 13. The rod is held against upward movement by a stop 14A.

Each drag band has its front end secured to a block 16 which has a screw-threaded pin 17 passing through an open-ended slot 18 in a lug 19 fixed to the end of a lever 20, and the block 16 is held in position in the lug by a nut 21. Each lever is pivotly mounted on the bracket 4, and to the rear end of the lever there is attached at 22A a rod 22 having a screw-threaded portion 23. The lower end of the rod passes through a collar 24 mounted at the upper end of a short lever 25 whose lower end is fixed to one end of a rod 26 which is rotable and extends between end mountings 27. One end of an arm 28 is fixed to rod 26 and the outer end of the arm is bent inwards and carries a short roller 29. On the threaded portion 23 there is located a nut 30 and two opposed cups 31, 32 between which extends a compression spring 33 surrounding the rod 22. Thus, by appropriate adjustment of nut 30 to increase or decrease the spring pressure, the pull on the forward end of the lever 20 to which the front end of the band 6 is attached can be varied.

822,735 Improved Wool Chlorination Process

J. R. GEIGY A.-G., 215 *Schwarzwaldallee, Basle, Switzerland.*

An improvement in the chlorine processing of wool in order to reduce felting and creasing.

It has been found that on chlorinating wool in acid solution with chlorine possibly obtained from the alkali salts of hypochlorous acid, that the too great rapidity of chlorination and the non-uniformity of the material, can be excellently reduced in a simple manner if the chlorination is performed in the presence of hydroxyalkylated 2.4.6-triamino-1.3.5-triazinyl compounds which contain at the three amino nitrogen atoms at least 4 hydrogen atoms but no aromatic substituents and each hydroxyl group of which has at least two carbon atoms. In one example, 5 parts of cleaned wool hanks are gently moved about in a bath containing 150 parts of water, 0·3 parts of concentrated sulphuric acid (98%) and 0.013 parts of 2-monohydroxyethyl-amino - 4·6 - diamino - 1.3.5-triazine. At 15° - 20°C. a dilute hypochlorite lye containing 0·075 parts of active chlorine is poured in within 15 minutes either in several portions or in a continuous stream. After moving the goods in the bath for 30 min., the wool is dechlorinated in the bath by adding to the bath a sodium bisulphite solution. Wool yarn which is fast to creasing is obtained which can be dyed very levelly.

822,823 Core Yarns and Fabrics

Z. K. CARROLL-PORCZYNSKI, *Moor View, Soaper Lane, Shelf, nr. Halifax.*

Core yarns are produced by passing tow of natural or artificial continuous filaments between feed rollers of direct spinning apparatus for breaking the tow into staple which is then drafted between feed and delivery rollers and combined with a continuous core or cores inserted into the staple immediately at the back of the front rollers. The combined staple and core are twisted together on emerging from the front rollers.

If desired, the core may be stretched by any suitable means prior to incorporation in the staple.

When combining viscose staple with a continuous nylon filament core, by prestressing the nylon filament prior to its incorporation with the viscose, a yarn may be produced which gives simultaneous break of each component when subjected to stress, thereby increasing the tensile strength of the core yarn.

Another advantage of prestressing the core component ensures that the core becomes completely buried in the middle of the resulting yarn.

822,902 Washing Spindle Housings and Spindles

ALBERT REICHERT, *Unterkotzauer Weg* 23, *Hof/Saale, Germany.*

A travelling machine for washing the spindle housings and spindles of spinning and twisting machines. The machine comprises a washing oil reservoir; a fresh oil reservoir, and two pumps combined to form one unit which is arranged above the washing oil reservoir. One of these pumps draws washing oil by suction from the reservoir and delivers it under pressure through a duct to a washing head while the other pump withdraws the oil by suction from the washing head through a duct and filter and delivers it back to the washing oil reservoir. A further pump for the fresh oil is arranged above the fresh oil reservoir.

822,934 Improved Shuttle Guard

J. HALL, 51 *Ransgreave Road, Wilpshire, Blackburn.*

A shuttle guard is mounted on a loom sley cap by means of two link members connected together by means of a spring to form a pair. There are one or more pairs mounted in such a way that the shuttle guard is collapsible upon itself, towards and away from the sley cap, with a parallel motion. An important feature is an arrangement whereby the guard will automatically expand from its collapsed to its "open" position, when the sley moves backward when starting the loom.

823,168 Waterproofing Fabrics

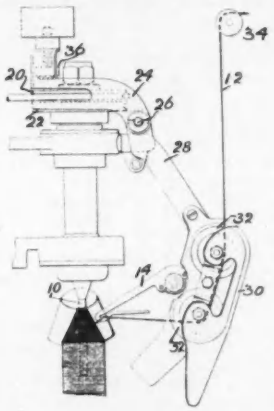
DEERIN MILLIKEN RESEARCH CORPORATION, *P.O. Box* 27, *Pendleton, South Carolina, U.S.A.*

A composition for rendering materials water-repellant, comprises an ammoniacal emulsion of a silicone resin which comprises an emulsifiable, further polymerisable organic hydrogen polysiloxane. The emulsion contains as emulsifying agent, one or more ammonium salts of a carboxylic acid, and stannous, cuprous or ferrous hydroxids, and a magnesium or an alkaline earth metal compound which ionizes in solution to give magnesium or alkaline earth metal ions. In one example, in suitable stainless steel reaction vessel, there is placed 390 parts of toluene and 90 parts of Perclene (tetrachloroethylene) and to the mixture is added 52 parts of Armour Neofat 14 (myristic acid) and 18 parts of Armour Neofat 16 (palmitic acid). The mixture is warmed and stirred until the fatty acid material is dissolved and there is then added 450 parts of Dow Corning 1107 silicone resin (a methyl hydrogen polysiloxane). Stirring is continued until the resin is dissolved. In another stainless steel reaction vessel there is placed 738 parts of water, at a temperature of 20 to 40°C., to which there is then added, with constant stirring, 40 parts of concentrated (97%) sulphuric acid. There is then added to the acid solution, with constant stirring, 1 part of calcium carbonate and 1 part of magnesium carbonate and the evolved carbon dioxide is allowed to escape. There is added, with constant stirring, 200 parts of stannous chloride dihydrate, preferably containing a minimum amount of stannous oxychloride or other impurities resulting from oxidation, and the mixture is stirred until there are no lumps. There is then added 20 parts of stannic chloride pentahydrate and the mixture is stirred until it is homogeneous. In another stainless steel container there is placed 95 parts of water and to this there is added, in the order listed and with stirring, the following: 2 parts of the prepared inorganic solution, 1 to 5 parts of concentrated ammonium hydroxide and 2 parts of the prepared organic solution. This is the final emulsion, and can be employed in undiluted form for application to textiles by a padding technique or it can be employed in diluted form for application by an exhaustion technique.

823,041 Winding Machine Stop Motion

JAMES MACKIE AND SONS LTD., *Albert Foundry, Belfast, N. Ireland.*

A stop motion for a winding frame, which utilises the frictional pull of the yarn on tensioning means to control the stop motion. The yarn 12 is laid on the spindle 10 by a traverse arm 14 oscillated in the vertical plane. The spindle is driven by a rope through a pulley 20 fast on the spindle and lying along-side a loose pulley 22. A shift lever 24 is mounted on the frame and has extension 28 which forms a detector lever. Near its end, the detector carries a yarn tensioner 30 consisting of two pairs of spring-pressed washers 32.

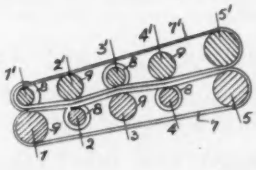


The yarn passes over a guide 34 and then through the tensioner and finally to the traverse arm which lays it on the nose of the cop. The shift lever carries a brake 36 which, when the rope is shifted on to the loose pulley bears on a face of the fast pulley and brings the spindle to rest. When the spindle is rotating the friction between the yarn and the tensioner causes the lower end of the detector to be pulled towards the spindle and the shift lever and brake to be held inoperative. If the yarn breaks, the frictional pull is eliminated and the unit swings on its pivot 26 so as to shift the rope on to the loose pulley and stop the spindle.

823,170 Double Apron Drafting Unit

SCHIESS AKT. GES., 289 *Hansa-Allee, Dusseldorf-Oberkassel, Germany.*

Improved double-belt drawing roller units for spinning machines. The unit comprises lower and upper belts 7, 7^1 adapted to engage spaced slivers between them, and pairs of mating guide rollers 1 to 5 and 1^1 to 5^1 with one roller of each pair located in belt 7^1 and the other roller located in the belt 7. The successive roller pairs 1, 1^1 to 4, 4^1 are each composed of a guide roller (1^1, 2, 3^1, or 4) provided with recesses 8 each in the line of one of the slivers, with one recess to each sliver, and a mating guide roller (1, 2^1, 3 or 4^1) having a surface 9 co-operating with, and extending beyond the recesses in the recessed roller,



the recessed rollers of the successive pairs of rollers being located alternately in the upper belt and the lower belt, respectively. The slivers pass between rollers (not shown) outside the double-belt drawing unit and having fluted portions which lie in the path of the slivers and which are spaced along the rollers to suit the spacing between the slivers. The widths of the recesses correspond to the widths of the fluted portions so that the transverse motion of the slivers while being drawn into the apparatus can be retained in the usual form.

823,211 Automatic Pirn-Winding Machine

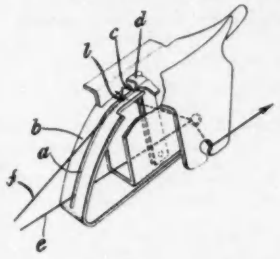
W. REINERS, *Peter-Nonnenmuhlen-Allee* 54, *Munchen Gladbach, Rheinland, Germany.*

In a method of winding bobbins in an automatic bobbin-changing machine, the thread from a wound bobbin is gripped temporarily near one end of the empty bobbin but without touching the body of the bobbin when the bobbins are changed, and is released when the rotational speed of the fresh bobbin reaches a predetermined value. Preferably the thread is deliberately parted from the previous run of thread at or after the moment when the thread is gripped. By this means the use of a revolving head is avoided.

823,264 Loom Shuttles

WOOL INDUSTRIES RESEARCH ASSOCIATION, *Torridon, Headingley, Leeds* 6.

Describes a shuttle which has a deflector device for the yarn before it reaches the eye through which it passes out of the shuttle. The slot "a" formed in a cam surface "b." is open at its upper end "c." This upper end is situated immediately behind and in line with the top of the conventional tensioning plates "d." The size of the slot is sufficient to permit free



passage of the weft "e" or "f" as the yarn unwinds from the weft package (not shown) and passes through the tensioning plates "d" whilst also being too small to allow a knot "l" to pass through it. This ensures that the yarn will run between the tensioning plates "d" during weaving in the same manner as it does when the knot deflector is not used, and that any knots in the yarn will pass up the inclined surface "b" of the knot deflector and so over the tensioning plates "d." The normal and deflected paths of the yarn are shown at "e" and "f." Immediately a knot "l" has passed over the deflector, the yarn again runs down between the tensioning plates, so that any change in running tension which may occur as a knot passes through the shuttle eye will be of the shortest possible duration.

823,277 Wool Scouring

E. F. DREW AND CO. INC., 15 *East 26th Street, New York, U.S.A.*

A continuous process for scouring raw wool comprises feeding raw wool through bowls comprising three groups, namely, desuinting bowls, scouring bowls, and rinsing bowl or bowls, feeding water into the desuinting bowls at a temperature preferably higher than room temperature, and feeding water into the scouring bowls at a temperature higher than that in the desuinting bowls. A scouring bowl is initially charged with a high concentration, i.e. from 0·5 to 5·0 grams per litre, of a non-ionic detergent, not absorbed by the wool, at the commencement of the operation and the detergent is continuously added through the process. The wool is conveyed from the scouring bowls into rinsing bowls and fresh water is fed in at a temperature below that in the scouring bowls and higher than that in the desuinting bowls.

823,382 Improved Beat-Up on Looms

DEVELOPMENT TEXTILE SOCIETE ANONYME (DETESA), 26 *Haupstrasse, Vadus, Liechenstein.*

A rectilinear loom has a comb for guiding the warp threads at the region where they pass to the drum, and a stripper for engaging the fabric where it leaves the drum and for lifting the weft threads out of the slots provided in the drum or drum discs. Each of the slots includes one arm pointing in the forward direction and another arm inclined outwards and rearwards at an obtuse angle, the rear wall of the rearward arm operating to beat up the weft threads and both arms are of uniform width.

823,396 Hand-Operated Yarn Knotters

COOK AND CO. MANCHESTER LTD., 206 *Royal Exchange, Manchester* 2.

A hand knotter comprises a frame with means whereby it can be carried on the user's hand, the frame having a trigger-operated knotting bill rotated by gearing operated by the trigger to provide the desired number of rotations of the knotting bill for each operation of the trigger. The trigger also operates a nipping mechanism on the inside of one side of the framework. and also on the inside of the opposite side of the framework. A thread moving member is adjacent to a cutter on a stripper member. The framework has slots at both sides and a guide between the sides to direct the threads into their proper slots and to ensure their correct positioning with the knotting bill and the stripper during the knotting operation. A tight double weaver's knot is formed with tails to the knot.

823,669 Connecting Belt Ends

R. HUTET, 37 *Cours d'Herbouville, Lyon (Rhone), France.*

A method for connecting by glueing between the two ends of a woven or plaited belt or strap. An auxiliary assembling element is used which is coated throughout its periphery with a film of synthetic adhesive material to be introduced after the manner of the filling of a sandwich by a few centimetres inside each of the two ends of the belt, the ends being juxtaposed endwise without overlapping inside the ends. The auxiliary element is constituted also by a section of a woven or plaited strap. It is not essentially tubular and its breadth is slightly less than that of the actual belt so that it may be readily inserted inside the latter.

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